BECKHOFF New Automation Technology

Documentation | EN

# EP1xxx

## EtherCAT Box modules with digital inputs


2021-11-23 | Version: 3.3

# Table of contents

**1 Foreword ..... 7**
1.1 Notes on the documentation ..... 7
1.2 Safety instructions ..... 8
1.3 Documentation issue status ..... 9
**2 EtherCAT Box - Introduction ..... 12**
**3 Product overview ..... 14**
3.1 Module overview ..... 14
3.2 EP1008, EP1018 ..... 15
3.2.1 EP1008, EP1018 - Introduction ..... 15
3.2.2 EP1008, EP1018 - Technical Data ..... 17
3.2.3 EP1008, EP1018 - Scope of supply ..... 18
3.2.4 EP1008-00xx - Process image ..... 19
3.3 EP1098-0001 ..... 20
3.3.1 EP1098-0001 - Introduction ..... 20
3.3.2 EP1098-0001 - Technical Data ..... 21
3.3.3 EP1098-0001 - Scope of supply ..... 23
3.3.4 EP1098-0001 - Process image ..... 24
3.4 EP1111-0000 ..... 25
3.4.1 EP1111-0000 - Introduction ..... 25
3.4.2 EP1111-0000 - Technical Data ..... 26
3.4.3 EP1111-0000 - Scope of supply ..... 27
3.4.4 EP1111-0000 - Process image ..... 28
3.5 EP1258-000x ..... 29
3.5.1 EP1258-000x - Introduction ..... 29
3.5.2 EP1258-000x - Technical Data ..... 30
3.5.3 EP1258-000x - Scope of supply ..... 32
3.5.4 EP1258-0001 - Process image ..... 32
3.6 EP1809, EP1819 ..... 33
3.6.1 EP1809-0021, EP1819-0021 - Introduction ..... 33
3.6.2 EP1809-0022, EP1819-0022 - Introduction ..... 34
3.6.3 EP1809, EP1819 - Technical data ..... 35
3.6.4 EP1809, EP1819 - Scope of supply ..... 36
3.6.5 EP1809-0021 - Process image ..... 37
3.7 EP1809-0042 ..... 38
3.7.1 EP1809-0042 - Introduction ..... 38
3.7.2 EP1809-0042 - Technical data ..... 39
3.7.3 EP1809-0042 - Scope of supply ..... 40
3.7.4 EP1809-0042 - Process image ..... 41
3.8 EP1816-0003 ..... 42
3.8.1 EP1816-x008 - Introduction ..... 42
3.8.2 EP1816-0003 - Technical data ..... 43
3.8.3 EP1816-0003 - Scope of supply ..... 44
3.8.4 EP1816-0003 - Process image ..... 45
3.9 EP1816-x008 ..... 46

3.9.1 EP1816-x008 - Introduction ... 46
3.9.2 EP1816-x008 - Technical data ... 47
3.9.3 EP1816-000x - Scope of supply ... 49
3.9.4 EP1816-0008 - Process image ... 50
3.9.5 EP1816-1008 – Process image ... 51
3.9.6 EP1816-3008 - Process image ... 52
3.10 EP1839-0042 ... 54
3.10.1 EP1839-0042 - Introduction ... 54
3.10.2 EP1839-0042 - Technical data ... 56
3.10.3 EP1839-0042 - Scope of supply ... 57
3.10.4 EP1839-0042 - Process image ... 58
3.11 EP1859-0042 ... 64
3.11.1 EP1859-0042 - Introduction ... 64
3.11.2 EP1859-0042 - Technical data ... 66
3.11.3 EP1859-0042 - Scope of supply ... 68
3.11.4 EP1859-0042 - Process image ... 69

**4 Mounting and connection ... 70**
4.1 Mounting ... 70
4.1.1 Dimensions EPxxxx-xx0x and EPxxxx-xx1x ... 70
4.1.2 Dimensions EPxxxx-xx2x ... 71
4.1.3 EPxxxx-xx42 dimensions ... 72
4.1.4 Fixing ... 73
4.1.5 Functional earth (FE) ... 74
4.1.6 Additional checks ... 74
4.2 Connections ... 75
4.2.1 Tightening torques for plug connectors ... 75
4.2.2 Protective caps ... 75
4.2.3 EtherCAT ... 76
4.2.4 Supply voltages ... 78
4.2.5 Digital inputs ... 82
4.2.6 Digital outputs (EP1859-0042 only) ... 97
4.3 UL Requirements ... 98
4.4 ATEX notes ... 99
4.4.1 ATEX - Special conditions ... 99
4.4.2 BG2000 - EtherCAT Box protection enclosures ... 100
4.4.3 ATEX Documentation ... 101
4.5 Disposal ... 102

**5 Commissioning and configuration ... 103**
5.1 Integration in TwinCAT ... 103
5.2 Setting the Hot Connect ID (EP1111-0000 only) ... 104
5.3 Adapt process image (EP1839-0042 only) ... 105
5.4 Configure inputs (EP1839-0042 only) ... 107
5.4.1 Input filter ... 107
5.4.2 Pulse extension ... 109
5.4.3 Wire break detection ... 111

5.4.4 Assignment of the connections ... 112
5.5 Configure sensor supply (EP1839-0042 only) ... 113
5.5.1 Switching outputs ... 113
5.5.2 Diagnostics ... 116
5.6 Acceleration measurement (EP1816-3008) ... 117
5.6.1 Acceleration axes ... 117
5.6.2 Configuration ... 118
5.6.3 Interpretation of the measured values ... 120
5.7 Inclination measurement (EP1816-3008) ... 121
5.7.1 Calculation in the Box ... 121
5.7.2 Calculation in the controller ... 123
5.7.3 Smoothing of measured values ... 126
5.8 Restoring the delivery state ... 128
5.9 Decommissioning ... 129

**6 CoE parameters ... 130**
6.1 EP1816-0008 - Object Overview ... 130
6.2 EP1816-0008 - Object description and parameterization ... 133
6.3 EP1816-3008 - Object overview ... 138
6.4 EP1816-3008 - Object description and parameterization ... 142
6.4.1 Objects to be parameterized during commissioning ... 143
6.4.2 Standard objects (0x1000-0x1FFF) ... 145
6.4.3 Profile-specific objects (0x6000-0xFFFF) ... 151
6.5 EP1839-0042 - Object overview ... 154
6.6 EP1839-0042 - Object description and parameterization ... 163
6.6.1 Standard objects (0x1000-0x1FFF) ... 163
6.6.2 Profile-specific objects (0x6000-0xFFFF) ... 173

**7 Appendix ... 186**
7.1 General operating conditions ... 186
7.2 Accessories ... 187
7.3 Version identification of EtherCAT devices ... 188
7.3.1 General notes on marking ... 188
7.3.2 Version identification of EP/EPI/EPP/ER/ERI boxes ... 189
7.3.3 Beckhoff Identification Code (BIC) ... 190
7.3.4 Electronic access to the BIC (eBIC) ... 192
7.4 Support and Service ... 194

# 1 Foreword

## 1.1 Notes on the documentation

### Intended audience

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.
It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

### Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.

We reserve the right to revise and change the documentation at any time and without prior announcement.

No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

### Trademarks

Beckhoff®, TwinCAT®, TwinCAT/BSD®, TC/BSD®, EtherCAT®, EtherCAT G®, EtherCAT G10®, EtherCAT P®, Safety over EtherCAT®, TwinSAFE®, XFC®, XTS® and XPlanar® are registered trademarks of and licensed by Beckhoff Automation GmbH. Other designations used in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owners.

### Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents: EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702 with corresponding applications or registrations in various other countries.


EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

### Copyright

## 1.2 Safety instructions

### Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

### Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

### Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

### Description of instructions

In this documentation the following instructions are used.
These instructions must be read carefully and followed without fail!

**⚠ DANGER**

**Serious risk of injury!**

Failure to follow this safety instruction directly endangers the life and health of persons.

**⚠ WARNING**

**Risk of injury!**

Failure to follow this safety instruction endangers the life and health of persons.

**⚠ CAUTION**

**Personal injuries!**

Failure to follow this safety instruction can lead to injuries to persons.

***NOTE***

**Damage to environment/equipment or data loss**

Failure to follow this instruction can lead to environmental damage, equipment damage or data loss.

**Tip or pointer**

This symbol indicates information that contributes to better understanding.

## 1.3 Documentation issue status

| Version | Comment |
|---|---|
| 3.3 | • EP1839-0042 added<br>• Technical data updated |
| 3.2 | • Information on freedom from interference added:<br>◦ EP1809-0042<br>◦ EP1859-0042<br>• Dimensions updated |
| 3.1 | • UL requirements updated<br>• EP1816-3008: Chapter "Acceleration measurement" updated<br>• EP1816-3008: Chapter "Inclination measurement" updated |
| 3.0 | • Front page updated<br>• Scope of delivery added |
| 2.8 | • EP18x9-0042: Technical data and connections updated |
| 2.7 | • EP1809-0042 added<br>• EP1816-0003 added<br>• EP1819-0021 added<br>• EP1859-0042 added |
| 2.6 | • Signal connection of EP1816-3008 corrected<br>• BG2000-0010 protection enclosure supplemented<br>• EP1098-0001 Introduction: 2-wire connection corrected<br>• EP1816-1008 added |
| 2.5.0 | • EP1816-3008 added |
| 2.4.1 | • EP1111-0000 – technical data updated |
| 2.4.0 | • Nut torques for connectors updated |
| 2.3.0 | • *Torque wrench* diagram updated<br>• Power Connection updated |
| 2.2.0 | • EP1008-0022 added<br>• EP1819-0021 added<br>• Cabling adjusted |
| 2.1.0 | • Nut torques for connectors extended |
| 2.0.0 | • Migration<br>• Technical data updated |
| 1.4.0 | • Chapter *Accessories* added<br>• Chapter on *Tightening torque for connectors* updated<br>• Chapter *EtherCAT connection* updated<br>• Chapter on *BG2000-0000 - protective housing for EtherCAT Box* updated |
| 1.3.0 | • EP1111-0000 added<br>• EP1098-0001 and EP1098-0002 added<br>• EP1809-0021, EP1809-0022 and EP1819-0022 updated |
| 1.2.0 | • ATEX notes added<br>• Extended temperature range for activated modules documented<br>• EP1809-0021, EP1809-0022 and EP1819-0022 added<br>• Description of the power connection updated<br>• Overview of EtherCAT cables extended |

| Version | Modifications |
|---|---|
| 1.1.0 | • Technical data: Current consumption values amended<br>• Tightening torque for connectors added |
| 1.0.0 | • Process data description extended |
| 0.7 | • Description of status LEDs added<br>• Signal connection extended<br>• Explanation of the serial number adapted to the new standard |
| 0.6 | • Signal connection extended |
| 0.5 | • First preliminary version |

### Firmware and hardware versions

This documentation refers to the firmware and hardware version that was applicable at the time the documentation was written.

The module features are continuously improved and developed further. Modules having earlier production statuses cannot have the same properties as modules with the latest status. However, existing properties are retained and are not changed, so that older modules can always be replaced with new ones.

The firmware and hardware version (delivery state) can be found in the batch number (D-number) printed on the side of the EtherCAT Box.

### Syntax of the batch number (D-number)

| D: WW YY FF HH | Example with D no. 29 10 02 01: |
|---|---|
| WW - week of production (calendar week) | 29 - week of production 29 |
| YY - year of production | 10 - year of production 2010 |
| FF - firmware version | 02 - firmware version 02 |
| HH - hardware version | 01 - hardware version 01 |

Further information on this topic: Version identification of EtherCAT devices [▶ 188].

# 2 EtherCAT Box - Introduction

The EtherCAT system has been extended with EtherCAT Box modules with protection class IP67. Through the integrated EtherCAT interface the modules can be connected directly to an EtherCAT network without an additional Coupler Box. The high-performance of EtherCAT is thus maintained into each module.

The extremely low dimensions of only 126 x 30 x 26.5 mm (h x w x d) are identical to those of the Fieldbus Box extension modules. They are thus particularly suitable for use where space is at a premium. The small mass of the EtherCAT modules facilitates applications with mobile I/O interface (e.g. on a robot arm). The EtherCAT connection is established via screened M8 connectors.

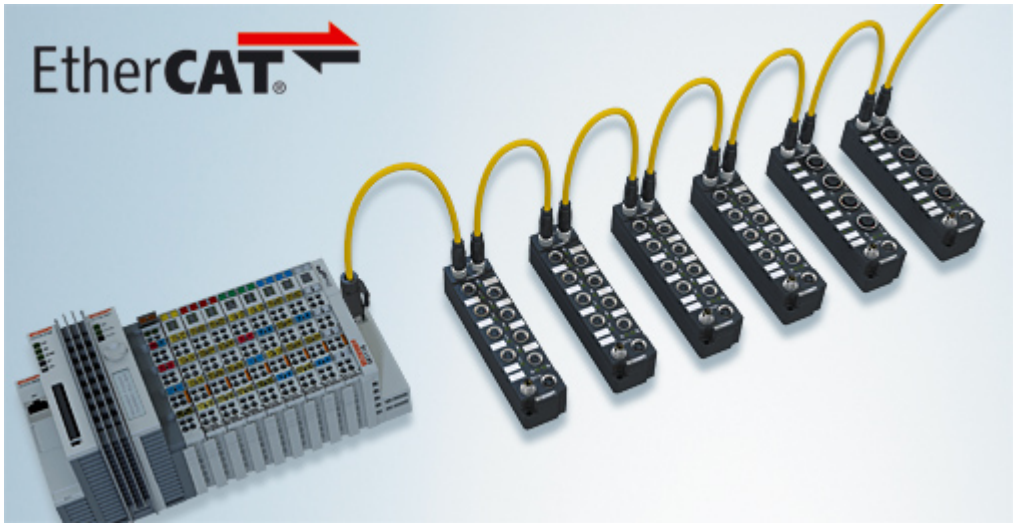



Fig. 1: EtherCAT Box Modules within an EtherCAT network

The robust design of the EtherCAT Box modules enables them to be used directly at the machine. Control cabinets and terminal boxes are now no longer required. The modules are fully sealed and therefore ideally prepared for wet, dirty or dusty conditions.

Pre-assembled cables significantly simplify EtherCAT and signal wiring. Very few wiring errors are made, so that commissioning is optimized. In addition to pre-assembled EtherCAT, power and sensor cables, field-configurable connectors and cables are available for maximum flexibility. Depending on the application, the sensors and actuators are connected through M8 or M12 connectors.

The EtherCAT modules cover the typical range of requirements for I/O signals with protection class IP67:

- digital inputs with different filters (3.0 ms or 10 µs)
- digital outputs with 0.5 or 2 A output current
- analog inputs and outputs with 16 bit resolution
- Thermocouple and RTD inputs
- Stepper motor modules

XFC (eXtreme Fast Control Technology) modules, including inputs with time stamp, are also available.

Fig. 2: EtherCAT Box with M8 connections for sensors/actuators

Fig. 3: EtherCAT Box with M12 connections for sensors/actuators

**Basic EtherCAT documentation**

You will find a detailed description of the EtherCAT system in the Basic System Documentation for EtherCAT, which is available for download from our website (www.beckhoff.com) under Downloads.

# 3 Product overview

## 3.1 Module overview

| Module | Number of inputs | Filter | Signal connection | EtherCAT connection | Comment |
|---|---|---|---|---|---|
| EP1008-0001 [▶ 15] | 8 | 3.0 ms | 8x M8 | M8 | |
| EP1008-0002 [▶ 15] | 8 | 3.0 ms | 4x M12 | M8 | |
| EP1008-0022 [▶ 15] | 8 | 3.0 ms | 8x M12 | M8 | |
| EP1018-0001 [▶ 15] | 8 | 10 µs | 8x M8 | M8 | |
| EP1018-0002 [▶ 15] | 8 | 10 µs | 4x M12 | M8 | |
| EP1098-0001 [▶ 20] | 8 | 10 µs | 8x M8 | M8 | switching to negative potential |
| EP1111-0000 [▶ 25] | 3 ID switches | - | - | M8 | for identifying EtherCAT groups |
| EP1258-0001 [▶ 29] | 8 | 10 µs | 8x M8 | M8 | 2 inputs with timestamp |
| EP1258-0002 [▶ 29] | 8 | 10 µs | 4x M12 | M8 | 2 inputs with timestamp |
| EP1809-0021 [▶ 33] | 16 | 3.0 ms | 16x M8 | M8 | |
| EP1809-0022 [▶ 34] | 16 | 3.0 ms | 8x M12 | M8 | |
| EP1809-0042 [▶ 38] | 16 | 3.0 ms | 8x M12 | M12 | |
| EP1816-0003 [▶ 42] | 16 | 10 µs | 2x ZS2001 | M8 | Pluggable spring-loaded terminals |
| EP1816-0008 [▶ 46] | 16 | 10 µs | 1x D-sub 25 | M8 | |
| EP1816-1008 [▶ 46] | 16 | 10 µs | 1x D-sub 25 | M8 | Undervoltage detection |
| EP1816-3008 [▶ 46] | 16 | 10 µs | 1x D-sub 25 | M8 | undervoltage detection, accelerometers |
| EP1819-0021 [▶ 33] | 16 | 10 µs | 16x M8 | M8 | |
| EP1819-0022 [▶ 34] | 16 | 10 µs | 8x M12 | M8 | |
| EP1839-0042 [▶ 54] | 16 | adjustable | 8x M12 | M12 | Switchable sensor supply, extended diagnostics. |
| EP1859-0042 [▶ 64] | 8 | 3.0 ms | 8x M12 | M12 | 8 digital outputs |

# 3.2 EP1008, EP1018

## 3.2.1 EP1008, EP1018 - Introduction

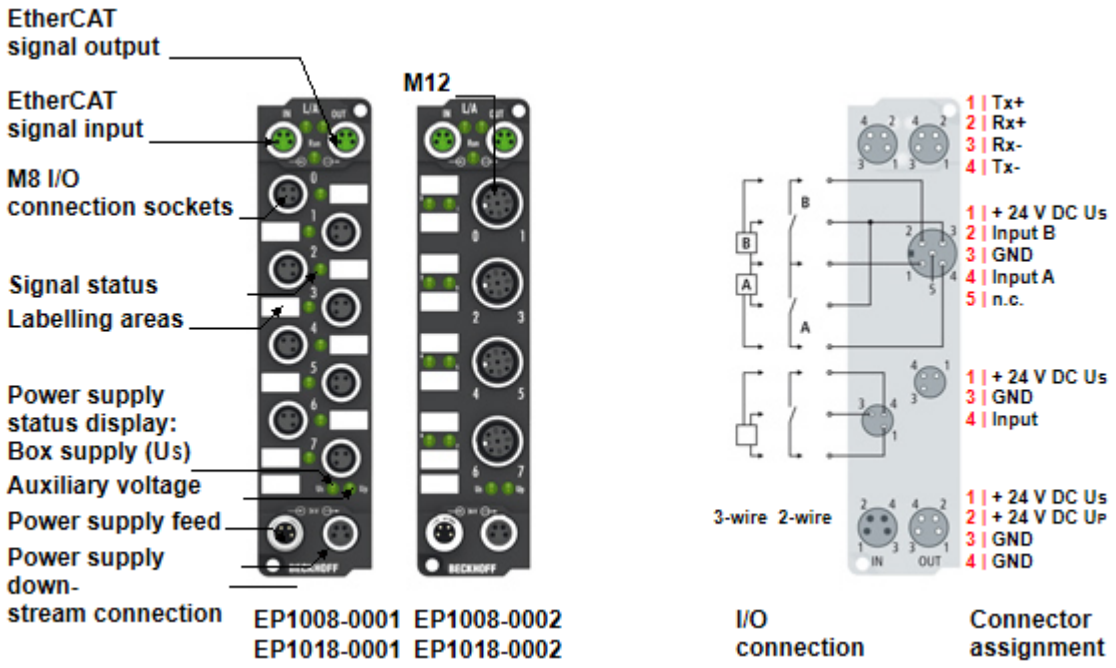



Fig. 4: EP1008-0001, EP1008-0002, EP1018-0001, EP1018-0002

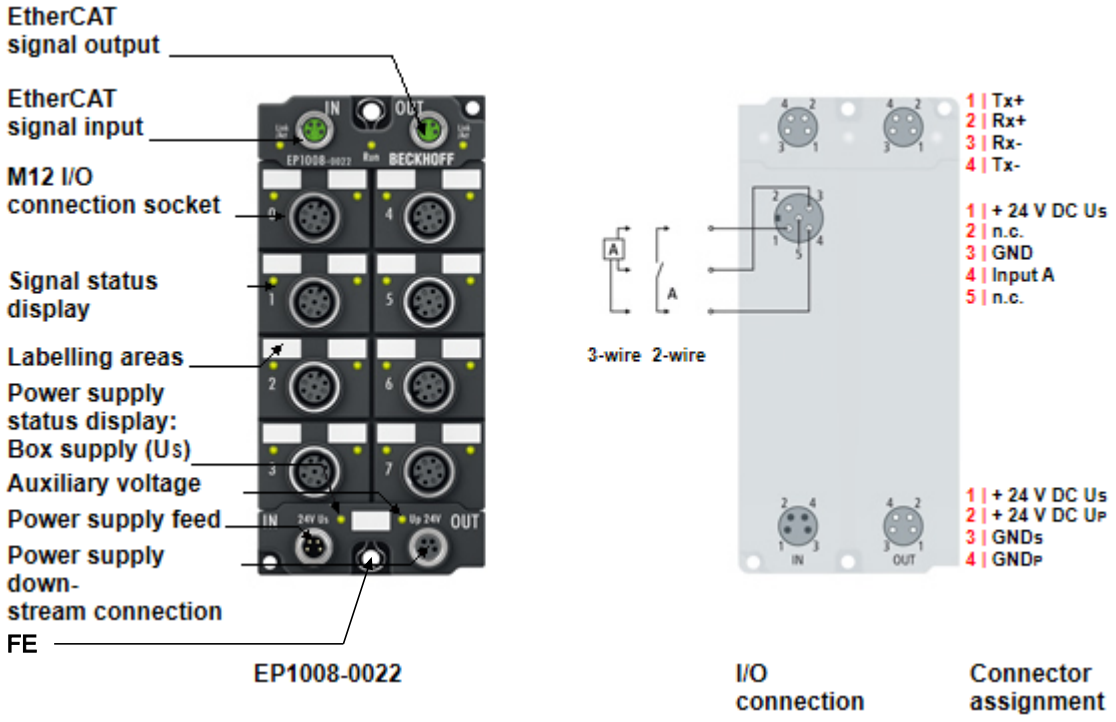



Fig. 5: EP1008-0022

### 8 digital inputs 24 $V_{DC}$

The EP1008 and EP1018 EtherCAT Box modules with digital inputs acquire binary control signals from the process level, and transfer them, electrically isolated, to the controller.

The status of the signal is displayed by light emitting diodes; the signal connection is made optionally through M8 connectors (EP1008-0001, EP1018-0001) or M12 connectors (EP1008-0002, EP1018-0002, EP1008-0022). These versions have input filters of different speeds.

The sensors are supplied from the control voltage Us. The load voltage Up is not used in the input module, but may be connected in order to be relayed downstream.

### Quick links

EP1008-0001:

Technical data [▶ 17]
Process image [▶ 19]
Dimensions [▶ 70]
Signal connection [▶ 82]

EP1008-0002:

Technical data [▶ 17]
Process image [▶ 19]
Dimensions [▶ 70]
Signal connection [▶ 84]

EP1008-0022:

Technical data [▶ 17]
Process image [▶ 19]
Dimensions [▶ 71]
Functional earth (FE) [▶ 74]
Signal connection [▶ 85]

EP1018-0001:

Technical data [▶ 17]
Process image [▶ 19]
Dimensions [▶ 70]
Signal connection [▶ 82]

EP1018-0002:

Technical data [▶ 17]
Process image [▶ 19]
Dimensions [▶ 70]
Signal connection [▶ 84]

## 3.2.2 EP1008, EP1018 - Technical Data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2x M8 socket, 4-pin, green |
| Electrical isolation | 500 V |

| Supply voltages | EP1008-0001 | EP1008-0002 | EP1008-0022 | EP1018-0001 | EP1018-0002 |
|---|---|---|---|---|---|
| Connection | Input: M8 connector, 4-pin<br>Downstream connection: M8 socket, 4-pin, black | | | | |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) | | | | |
| $U_S$ sum current: $I_{S,sum}$ | max. 4 A | | | | |
| Current consumption from $U_S$ | 120 mA + sensor supply | | | | |
| $U_P$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) | | | | |
| $U_P$ sum current: $I_{P,sum}$ | max. 4 A | | | | |
| Electrical isolation $GND_S$ / $GND_P$ | no | no | yes | no | no |

| Digital inputs | EP1008-0001 | EP1008-0002 | EP1008-0022 | EP1018-0001 | EP1018-0002 |
|---|---|---|---|---|---|
| Number of inputs | 8 | | | | |
| Connection | 8 x M8 socket | 4 x M12 socket | 8 x M12 socket | 8 x M8 socket | 4 x M12 socket |
| Nominal voltage | 24 $V_{DC}$ (-15%/+20%) | | | | |
| Input filter | 3.0 ms | 3.0 ms | 3.0 ms | 10 µs | 10 µs |
| Signal voltage "0" | -3 … +5 V (EN 61131-2, type 3) | | | | |
| Signal voltage "1" | +11 … +30 V (EN 61131-2, type 3) | | | | |
| Input current | 3 mA (EN 61131-2, type 3) | | | | |
| Sensor supply | 24 $V_{DC}$ from $U_S$<br>max. 0.5 A, short-circuit proof in total | | | | |

| Housing data | EP1008-0001 | EP1008-0002 | EP1008-0022 | EP1018-0001 | EP1018-0002 |
|---|---|---|---|---|---|
| Dimensions without connector<br>W x H x D | 30 mm x 126 mm x 26.5 mm | 30 mm x 126 mm x 26.5 mm | 60 mm x 126 mm x 26.5 mm | 30 mm x 126 mm x 26.5 mm | 30 mm x 126 mm x 26.5 mm |
| Weight | approx. 165 g | | | | |
| Installation position | variable | | | | |
| Material | PA6 (polyamide) | | | | |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25...+60 °C<br>-25...+55 °C according to cURus<br>0...+55 °C according to ATEX |
| Ambient temperature during storage | -40…+85 °C |
| Vibration resistance, shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27<br>Additional checks [▶ 18] |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) |

| Approvals / markings | EP1008-0001 | EP1008-0002 | EP1008-0022 | EP1018-0001 | EP1018-0002 |
|---|---|---|---|---|---|
| Approvals / markings | ATEX [▶ 99]<br>CE<br>cURus [▶ 98]<br>EAC<br>UKCA | ATEX [▶ 99]<br>CE<br>cURus [▶ 98]<br>EAC<br>UKCA | CE<br>cURus [▶ 98]<br>EAC<br>UKCA | ATEX [▶ 99]<br>CE<br>cURus [▶ 98]<br>EAC<br>UKCA | ATEX [▶ 99]<br>CE<br>cURus [▶ 98]<br>EAC<br>UKCA |

**Additional checks**

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

## 3.2.3 EP1008, EP1018 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

## 3.2.4 EP1008-00xx - Process image

**Channel 1 to Channel 8**

You will find the 8 digital inputs to the module (here using the EP1008-0001 as an example) under **Channel 1 to Channel 8**.

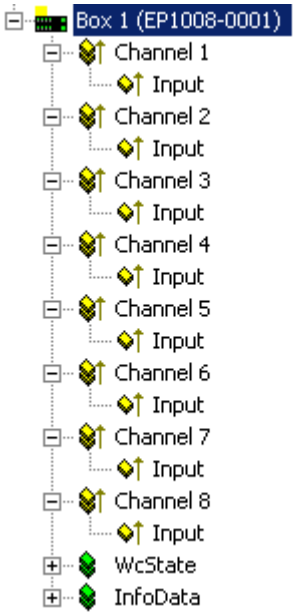



Fig. 6: EP1008-00xx, process image

# 3.3 EP1098-0001

## 3.3.1 EP1098-0001 - Introduction

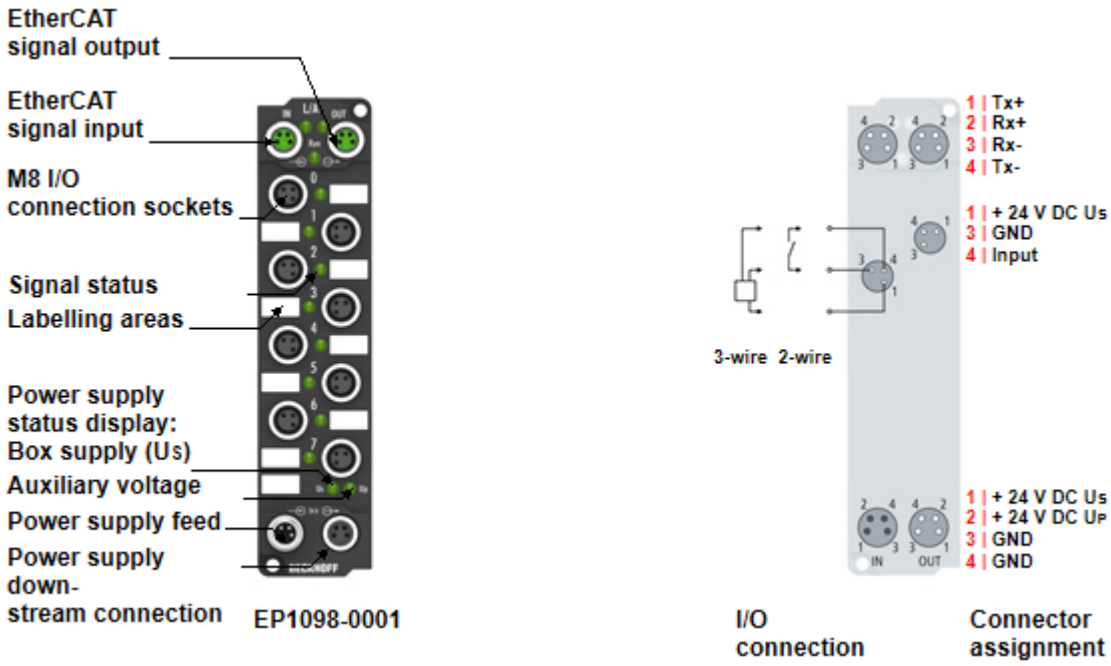



Fig. 7: EP1098-0001

**8 digital inputs, 24 $V_{DC}$, ground switching**

The EP1098-0001 EtherCAT Box with digital inputs acquires the binary control signals from the process level and transmits them, in an electrically isolated form, to the controller.

The status of the signal is displayed by light emitting diodes. The signal connection is made through M8 connectors (EP1098 -0001) or M12 connectors (EP1098 -0002).

The sensors are supplied from the control voltage Us. The load voltage Up is not used in the input module, but may be connected in order to be relayed downstream.

**Quick links**

Technical data [▶ 21]
Process image [▶ 24]
Dimensions [▶ 70]
Signal connection [▶ 82]

## 3.3.2 EP1098-0001 - Technical Data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2 x M8 socket, 4-pin, green |
| Electrical isolation | 500 V |

| Supply voltages | |
|---|---|
| Connection | Input: M8 connector, 4-pin<br>Downstream connection: M8 socket, 4-pin, black |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_S$ sum current: $I_{S,sum}$ | max. 4 A |
| Current consumption from $U_S$ | 120 mA + sensor supply |
| Rated voltage $U_P$ | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_P$ sum current: $I_{P,sum}$ | max. 4 A |
| Current consumption from $U_P$ | None. $U_P$ is only forwarded. |
| Electrical isolation $GND_S$ / $GND_P$ | no |

| Digital inputs, negative switching | |
|---|---|
| Number | 8 |
| Connection | 8 x M8 socket |
| Nominal input voltage | 24 $V_{DC}$ (-15%/+20%) |
| Input filter | 10 µs |
| Characteristics | negative switching |
| Signal voltage "0" | 11 … 30 V |
| Signal voltage "1" | 0 … 7 V |
| Input current | typically 3 mA (EN 61131-2, type 3) |
| Sensor supply | 24 $V_{DC}$ from $U_S$<br>max. 0.5 A, short-circuit proof in total |

| Housing data | |
|---|---|
| Dimensions W x H x D | 30 mm x 126 mm x 26.5 mm (without connectors) |
| Weight | approx. 165 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C<br>-25...+55 °C according to cURus |
| Ambient temperature during storage | -40…+85 °C |
| Vibration resistance, shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27<br>Additional checks [▶ 22] |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) |

| Approvals / markings | |
|---|---|
| Approvals / markings *) | CE, cURus [▶ 98], EAC, UKCA |

*) Real applicable approvals/markings see type plate on the side (product marking).

### Additional checks

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

### 3.3.3 EP1098-0001 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP1098-0001
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

## 3.3.4 EP1098-0001 - Process image

**Channel 1 to Channel 8**

You will find the 8 digital inputs to the module (here using the EP1098-0001 as an example) under **Channel 1 to Channel 8**.

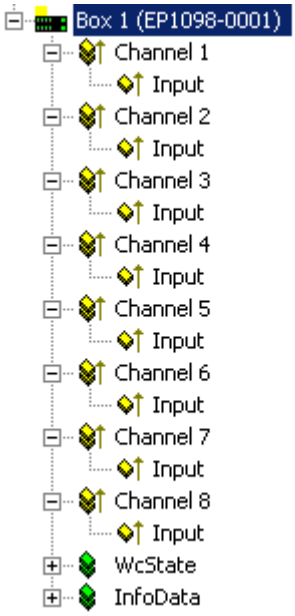



Fig. 8: EP1098-0001, Process image

# 3.4 EP1111-0000

## 3.4.1 EP1111-0000 - Introduction

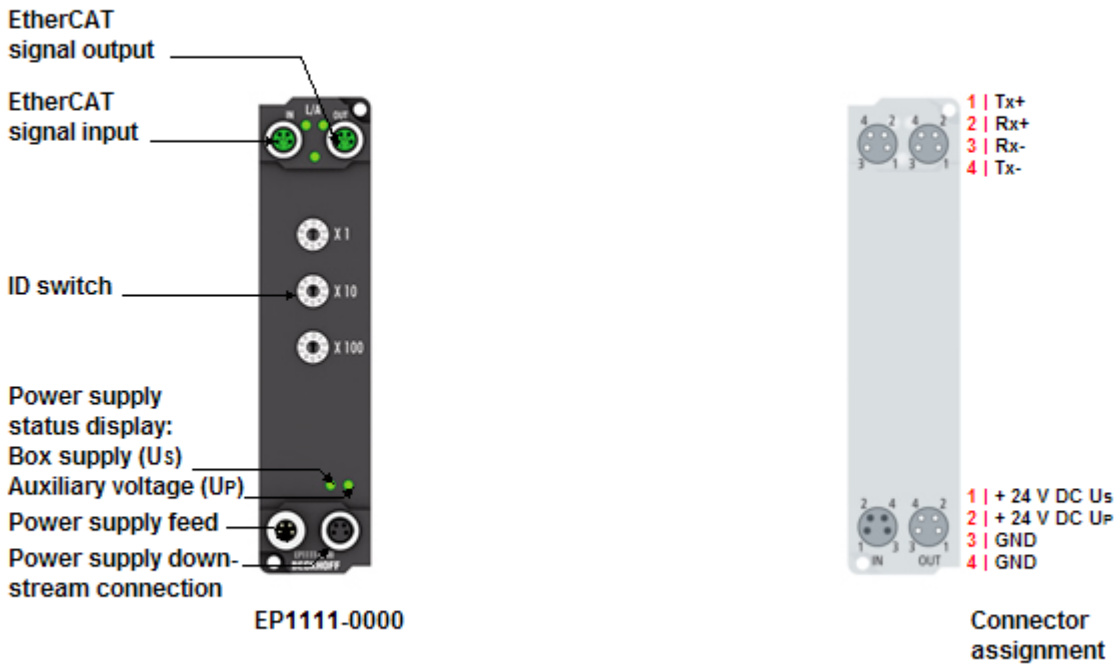



Fig. 9: EP1111-0000

**EtherCAT Box with ID switch**

The EP1111-0000 EtherCAT Box has three decimal ID switches, with which a group of EtherCAT components can be assigned an ID. This group can be present in any position in the EtherCAT network, as a result of which variable topologies can be realized in a simple manner.

The EtherCAT connection is established via shielded M8 connectors with direct display of link and activity status. The Run LED indicates the status of the EP1111.

**Quick links**

HotConnect in the EtherCAT system documentation.
Technical data [▶ 26]
Process image [▶ 28]
Dimensions [▶ 70]
Setting the Hot Connect ID [▶ 104]

## 3.4.2 EP1111-0000 - Technical Data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2 x M8 socket, 4-pin, green |
| Electrical isolation | 500 V |

| Supply voltages | |
|---|---|
| Connection | Input: M8 connector, 4-pin<br>Downstream connection: M8 socket, 4-pin, black |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_S$ sum current: $I_{S,sum}$ | max. 4 A |
| Current consumption from $U_S$ | 120 mA |
| Rated voltage $U_P$ | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_P$ sum current: $I_{P,sum}$ | max. 4 A |
| Current consumption from $U_P$ | None. $U_P$ is only forwarded. |

| ID switches | |
|---|---|
| Number | 3 |
| Positions per ID switch | 10 |
| Number of different IDs | 999 |

| Housing data | |
|---|---|
| Dimensions W x H x D | 30 mm x 126 mm x 26.5 mm (without connectors) |
| Weight | approx. 165 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C<br>-25...+55 °C according to cURus |
| Ambient temperature during storage | -40…+85 °C |
| Vibration resistance, shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27<br>Additional checks [▶ 26] |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) |

| Approvals / markings | |
|---|---|
| Approvals / markings *) | CE, cURus [▶ 98], EAC, UKCA |

*) Real applicable approvals/markings see type plate on the side (product marking).

### Additional checks

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

### 3.4.3 EP1111-0000 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP1111-0000
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

## 3.4.4 EP1111-0000 - Process image

### ID inputs

You will find input data of the ID switches under under **ID Inputs**.

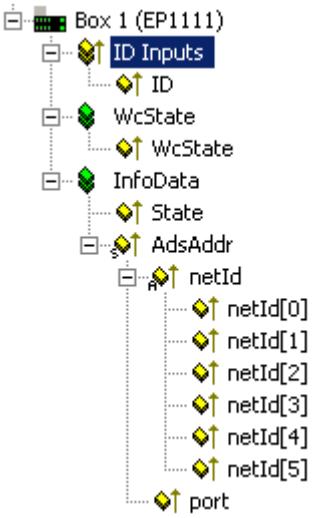



Fig. 10: EP1111-0000, ID inputs

# 3.5 EP1258-000x

## 3.5.1 EP1258-000x - Introduction

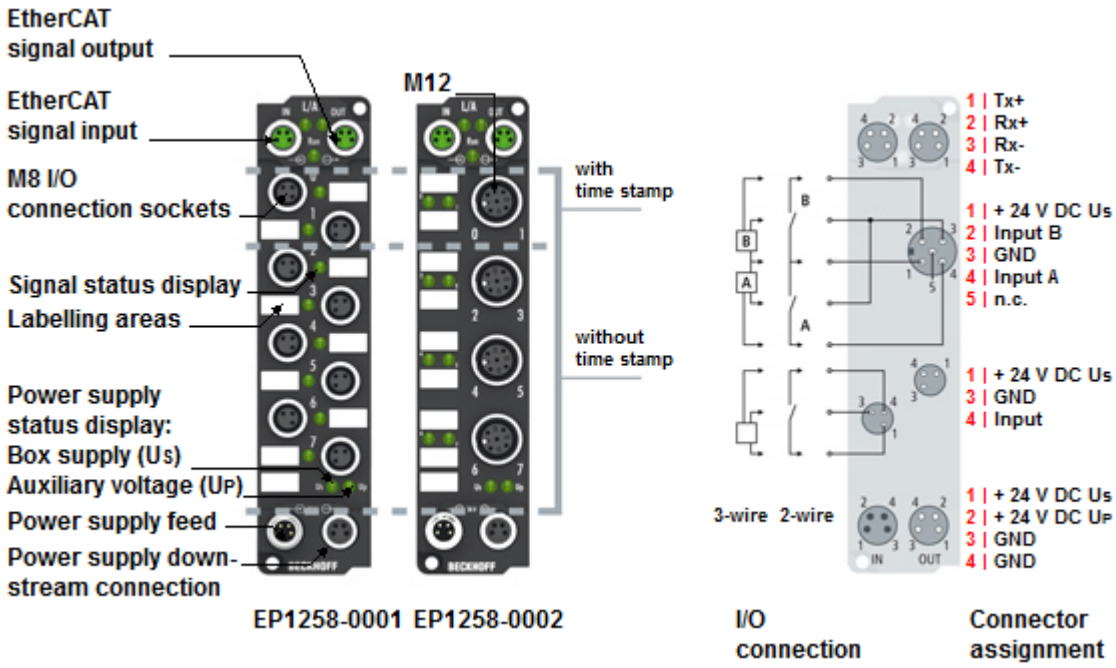



Fig. 11: EP1258-0001, EP1258-0002

### 8 digital inputs 24 $V_{DC}$ (two channels with time stamp)

The EP1258 EtherCAT Box with digital inputs acquires fast binary control signals from the process level and transmits them, electrically isolated, to the controller.
The status of the signal is displayed by light emitting diodes; the signal connection is made optionally through M8 connectors (EP1258-0001) or M12 connectors (EP1258-0002). Both modules have 10 µs input filters.
The sensors are supplied from the control voltage $U_S$. The peripheral voltage $U_P$ is not used in the input module, but may be connected in order to be relayed downstream.

### Distributed Clocks

Channels 0 and 1 are assigned a time stamp that shows the time of the last edge change with a resolution of 1 ns. This technology enables signals to be traced exactly over time and synchronized with the clocks distributed across the system. With this technology, machine-wide parallel hardware wiring of digital inputs or encoder signals for synchronization purposes is often no longer required. As a result, equally timed reactions, independent of the bus cycle time, are to a large extent possible. Distributed Clocks in the EtherCAT system documentation.

### Quick links

EP1258-0001

Technical data [▶ 30]
Dimensions [▶ 70]
Signal connection [▶ 82]

EP1258-0002

Technical data [▶ 30]
Dimensions [▶ 70]
Signal connection [▶ 84]

## 3.5.2 EP1258-000x - Technical Data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2 x M8 socket, 4-pin, green |
| Electrical isolation | 500 V |
| Distributed Clocks | yes |

| Supply voltages | |
|---|---|
| Connection | Input: M8 connector, 4-pin<br>Downstream connection: M8 socket, 4-pin, black |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_S$ sum current: $I_{S,sum}$ | max. 4 A |
| Current consumption from $U_S$ | 120 mA + sensor supply |
| Rated voltage $U_P$ | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_P$ sum current: $I_{P,sum}$ | max. 4 A |
| Current consumption from $U_P$ | None. $U_P$ is only forwarded. |
| Electrical isolation $GND_S$ / $GND_P$ | no |

| Digital inputs | EP1258-0001 | EP1258-0002 |
|---|---|---|
| Number | 8, of which 2 are Timestamp inputs | |
| Connection | 8 x M8 socket | 4 x M12 socket |
| Nominal input voltage | 24 $V_{DC}$ (-15%/+20%) | |
| Input filter | 10 µs | |
| Signal voltage "0" | -3 … +5 V (similar to EN61131-2, type 3) | |
| Signal voltage "1" | +11 … +30 V (similar to EN61131-2, type 3) | |
| Input current | typically 3 mA (similar to EN61131-2, type 3) | |
| Sensor supply | 24 $V_{DC}$ from $U_S$<br>max. 0.5 A, short-circuit proof in total | |
| Resolution time stamp | 1 ns (Channel 0/1) | |
| Precision of the time stamp | 10 ns (+ input delay) (Channel 0/1) | |
| Precision of the distributed clocks | < 100 ns (Channel 0/1) | |

| Housing data | |
|---|---|
| Dimensions W x H x D | 30 mm x 126 mm x 26.5 mm (without connectors) |
| Weight | approx. 165 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C<br>-25...+55 °C according to cURus |
| Ambient temperature during storage | -40…+85 °C |
| Vibration resistance, shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27<br>Additional checks [▶ 31] |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) |

| Approvals / markings | |
|---|---|
| Approvals / markings *) | CE, cURus [▶ 98], EAC, UKCA |

*) Real applicable approvals/markings see type plate on the side (product marking).

### Additional checks

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

### 3.5.3 EP1258-000x - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP1258-000x
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

### 3.5.4 EP1258-0001 - Process image

#### Channel 1 to Channel 8

You will find the 8 digital inputs to the module (here using the EP1258-0001 as an example) under **Channel 1 to Channel 8.**

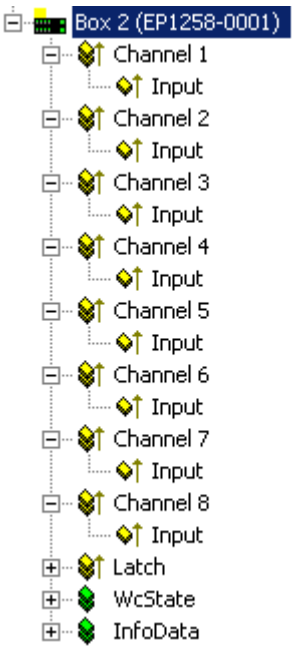



Fig. 12: EP1258-0001, Process image

# 3.6 EP1809, EP1819

## 3.6.1 EP1809-0021, EP1819-0021 - Introduction

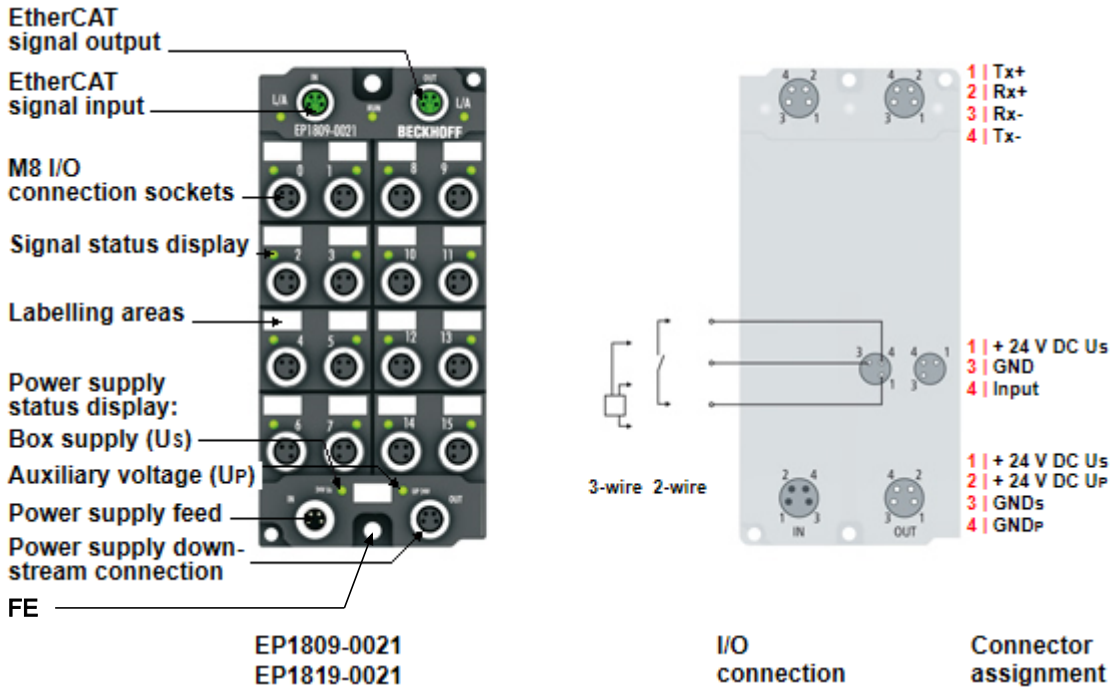



Fig. 13: EP1809-0021, EP1819-0021

### 16 digital inputs 24 $V_{DC}$

The EtherCAT modules EP1809-0021 and EP1819-0021 with digital inputs acquire binary control signals from the process level and transmit them, in an electrically isolated form, to the controller. The state of the signals is indicated by light emitting diodes. The signals are connected via M8 connectors.

The sensors are supplied from the box supply voltage $U_S$. The auxiliary voltage $U_P$ is not used in the input module, but may be connected in order to be relayed downstream.

### Quick links

Technical data [▶ 35]
Process image [▶ 37]
Dimensions [▶ 71]
Functional earth (FE) [▶ 74]
Signal connection [▶ 82]

## 3.6.2 EP1809-0022, EP1819-0022 - Introduction

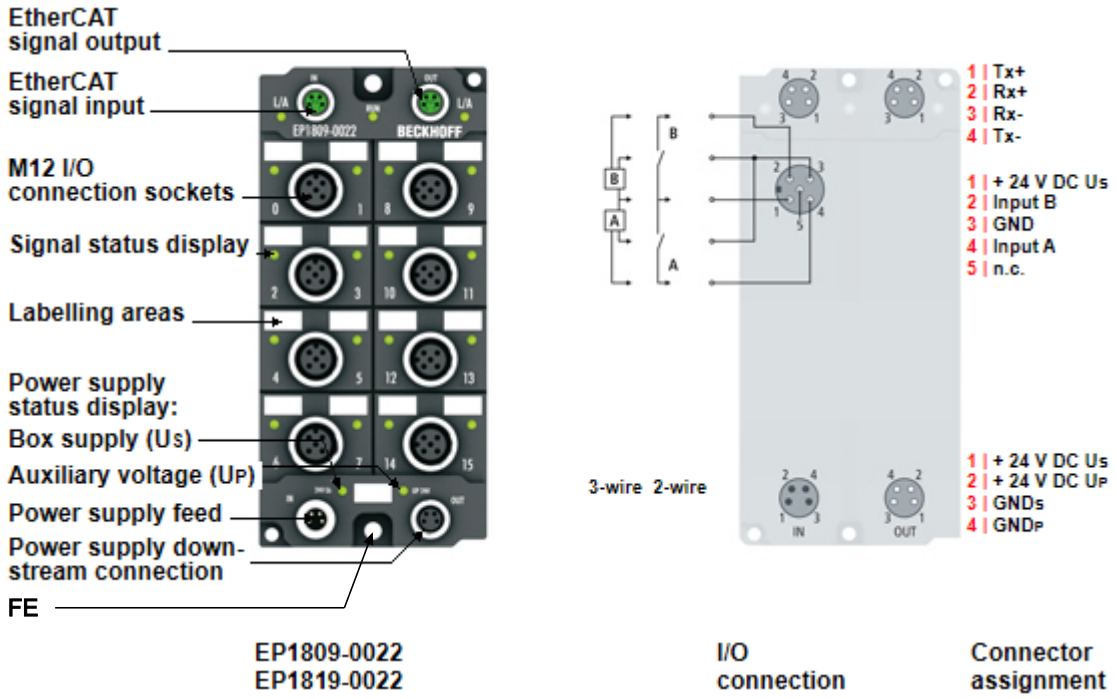



Fig. 14: EP1809-0022, EP1819-0022

### 16 digital inputs 24 $V_{DC}$

The EP1809-0022 and EP1819-0022 modules with digital inputs acquire the binary control signals from the process level and transmit them, in an electrically isolated form, to the controller. The state of the signals is indicated by light emitting diodes. The signals are connected via M12 connectors. These versions are distinguished by input filters of different speeds.

The sensors are supplied from the box supply voltage US. The auxiliary voltage UP is not used in the input module, but may be connected in order to be relayed downstream.

### Quick links

Technical data [▶ 35]
Process image [▶ 37]
Dimensions [▶ 71]
Functional earth (FE) [▶ 74]
Signal connection [▶ 86]

## 3.6.3 EP1809, EP1819 - Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2 x M8 socket, 4-pin, green |
| Electrical isolation | 500 V |

| Supply voltages | |
|---|---|
| Connection | Input: M8 connector, 4-pin<br>Downstream connection: M8 socket, 4-pin, black |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_S$ sum current: $I_{S,sum}$ | max. 4 A |
| Current consumption from $U_S$ | 130 mA |
| Rated voltage $U_P$ | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_P$ sum current: $I_{P,sum}$ | max. 4 A |
| Current consumption from $U_P$ | None. $U_P$ is only forwarded. |
| Electrical isolation $GND_S$ / $GND_P$ | yes |

| Digital inputs | EP1809-0021 | EP1809-0022 | EP1819-0021 | EP1819-0022 |
|---|---|---|---|---|
| Number | 16 | | | |
| Input connections | 16 x M8 socket | 8 x M12 socket | 16 x M8 socket | 8 x M12 socket |
| Nominal input voltage | 24 $V_{DC}$ (-15%/+20%) | | | |
| Input filter | 3 ms | 3 ms | 10 µs | 10 µs |
| Signal voltage "0" | -3 … +5 V (similar to EN 61131-2, type 3) | | | |
| Signal voltage "1" | +11 … +30 V (similar to EN 61131-2, type 3) | | | |
| Input current | 3 mA (similar to EN 61131-2, type 3) | | | |
| Sensor supply | 24 $V_{DC}$ from $U_S$<br>max. 0.5 A, short-circuit proof in total | | | |

| Housing data | |
|---|---|
| Dimensions W x H x D | 60 mm x 126 mm x 26.5 mm (without plug connectors) |
| Weight | approx. 250 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C<br>-25...+55 °C according to cURus |
| Ambient temperature during storage | -40…+85 °C |
| Vibration resistance, shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27<br>Additional checks [▶ 36] |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) |

| Approvals / markings | |
|---|---|
| Approvals / markings *) | CE, cURus [▶ 98], EAC, UKCA |

*) Real applicable approvals/markings see type plate on the side (product marking).

**Additional checks**

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

## 3.6.4 EP1809, EP1819 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

## 3.6.5 EP1809-0021 - Process image

**Channel 1 to Channel 16**

You will find the 16 digital inputs to the module (here using the EP1809-0021 as an example) under **Channel 1 to Channel 16.**

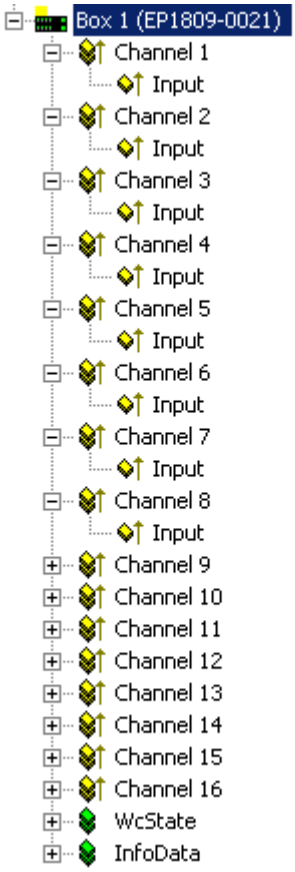



Fig. 15: EP1809-0021, Process image

# 3.7 EP1809-0042

## 3.7.1 EP1809-0042 - Introduction

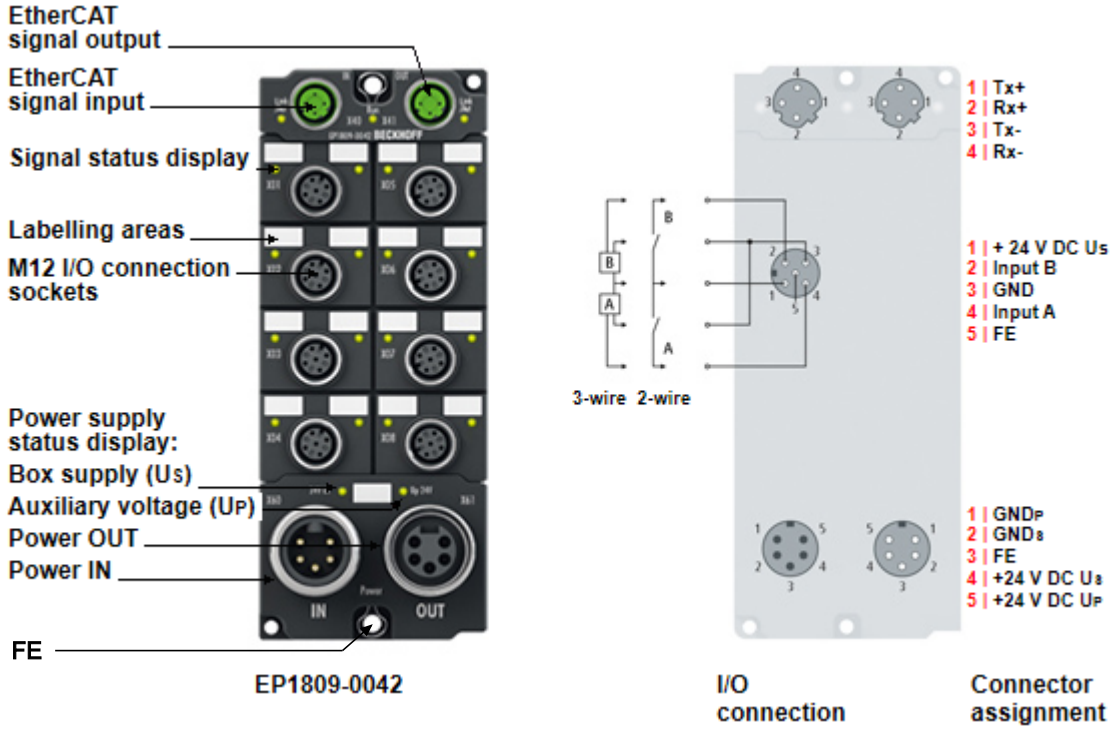



Fig. 16: EP1809-0042

**16-channel digital input 24 V DC, 3.0 ms**

The EP1809-0042 EtherCAT Box with digital inputs acquires the binary control signals from the process level and transmits them, in an electrically isolated form, to the controller. The state of the signals is indicated by light emitting diodes. The signals are connected via M12 screw type connectors.

The sensors are supplied from the box supply voltage $U_S$. The auxiliary voltage $U_P$ is not used in the input module, but may be connected in order to be relayed downstream.

The EP1809-0042 is interference-free. You can use the EP1809-0042 instead of an interference-free standard terminal in accordance with the following chapter of the TwinSAFE Application Guide:

- Chapter 4.1 "All-pole disconnection of a potential group with downstream interference-free standard terminals (Category 4, PL e)"
- Chapter 4.2 "Single-pole disconnection of a potential group with downstream interference-free standard terminals with fault exclusion (Category 4, PL e)"
- Chapter 4.3 "EL2911 potential group with interference-free standard terminals (Category 4, PL e)"

**Quick links**

Technical data [▶ 39]
Process image [▶ 41]
Dimensions [▶ 72]
Functional earth (FE) [▶ 74]
Signal connection [▶ 87]

## 3.7.2 EP1809-0042 - Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2x M12 socket, 4-pin, D-coded |
| Electrical isolation | 500 V |

| Supply voltages | |
|---|---|
| Connection | Input: 7/8" - plug, 5-pin<br>Downstream connection: 7/8" - socket, 5-pin |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_S$ sum current | max. 16 A at 40 °C |
| Current consumption from $U_S$ | 130 mA + sensor supply |
| Rated voltage $U_P$ | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_P$ sum current | max. 16 A at 40 °C |
| Current consumption from $U_P$ | None. $U_P$ is only forwarded. |

| Digital inputs | |
|---|---|
| Number | 16 |
| Connection | 8x M12 socket |
| Nominal input voltage | 24 $V_{DC}$ (-15%/+20%) |
| Input filter | 3 ms |
| Signal voltage "0" | -3 … +5 V (similar to EN 61131-2, type 3) |
| Signal voltage "1" | +11 … +30 V (similar to EN 61131-2, type 3) |
| Input current | 6 mA (similar to EN 61131-2, type 3) |
| Supply of the module electronics | from the control voltage $U_S$ |
| Current consumption of the module electronics | 130 mA |
| Sensor supply | 24 $V_{DC}$ from $U_S$<br>max. 0.5 A in total, short-circuit proof |

| Housing data | |
|---|---|
| Dimensions W x H x D | 60 mm x 150 mm x 26,5 mm (without connectors) |
| Weight | approx. 440 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C |
| Ambient temperature during storage | -40…+85 °C |
| Vibration / shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27 |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 conforms to EN 60529 |

| Approvals/markings | |
|---|---|
| Approvals/markings *) | CE, EAC, UKCA, UL under preparation |

*) Real applicable approvals/markings see type plate on the side (product marking).

**Additional checks**

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

## 3.7.3 EP1809-0042 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP1809-0042
- 2x protective cap for EtherCAT socket, M12 (pre-assembled)
- 1x Protective cap for supply voltage output, 7/8”, black (pre-fitted)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

### 3.7.4 EP1809-0042 - Process image

The process image contains a process data object for each digital input.

The name of each process data object contains the name of the socket and the pin number of the corresponding digital input.

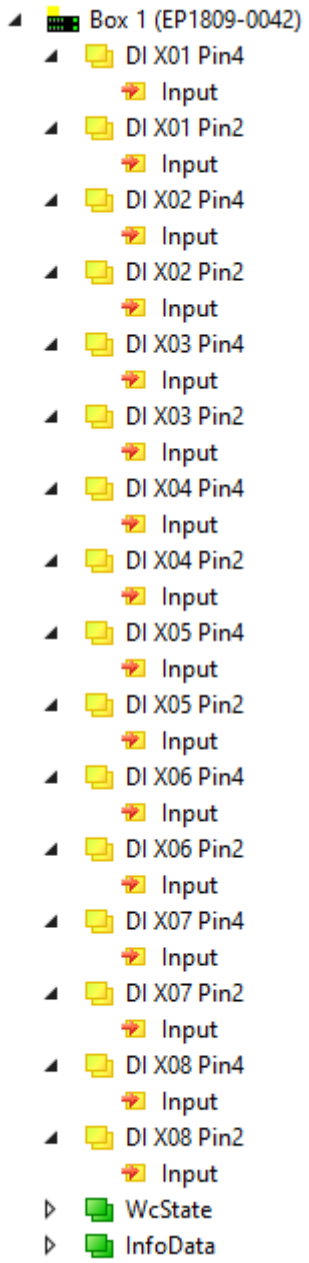



Fig. 17: EP1809-0042 - Process image

# 3.8 EP1816-0003

## 3.8.1 EP1816-x008 - Introduction

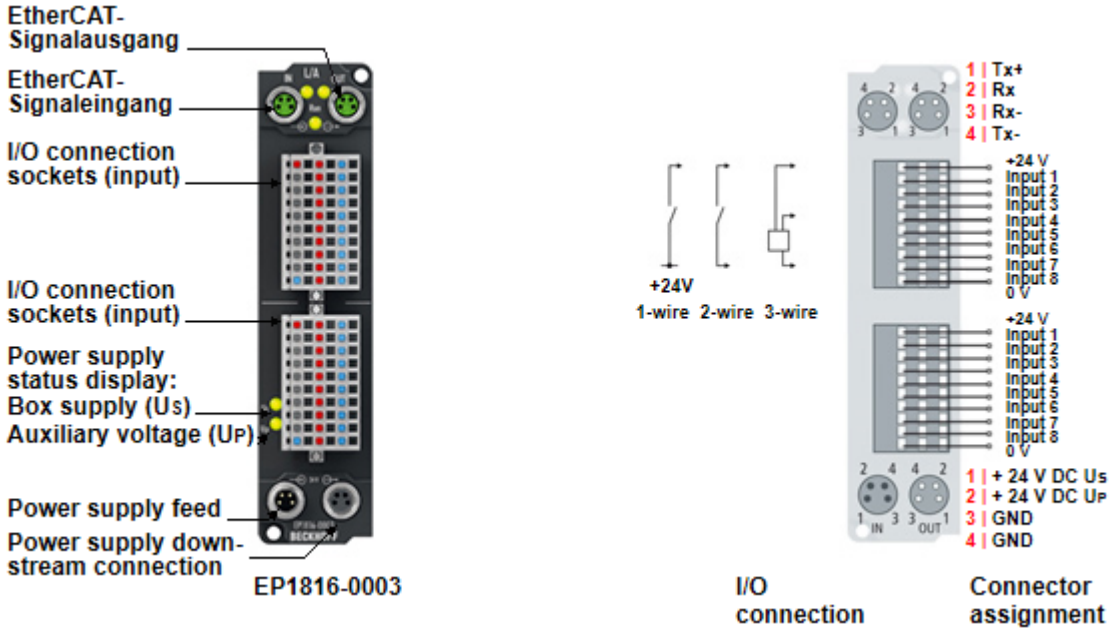



Fig. 18: EP1816-0003

**EP1816-0003 | 16-channel digital input 24 V DC**

The EP1816-0003 EtherCAT Box with digital inputs acquires the binary control signals from the process level and transmits them, in an electrically isolated form, to the controller. The state of the signals is indicated by light emitting diodes. For the signal connection connectors with a spring-loaded system are used, optionally available with 1 or 3 pins. The module is supplied without connectors.

The sensors are supplied from the box supply voltage $U_S$. The auxiliary voltage $U_P$ is not used in the input module, but may be connected in order to be relayed downstream.

**Quick links**

Technical data [▶ 43]
Process image [▶ 45]
Dimensions [▶ 70]
Signal connection [▶ 92]

## 3.8.2 EP1816-0003 - Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2 x M8 socket, 4-pin, green |
| Electrical isolation | 500 V |
| Distributed Clocks | yes |

| Supply voltages | |
|---|---|
| Connection | Input: M8 connector, 4-pin<br>Downstream connection: M8 socket, 4-pin, black |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_S$ sum current: $I_{S,sum}$ | max. 4 A |
| Current consumption from $U_S$ | 120 mA + sensor supply |
| Rated voltage $U_P$ | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_P$ sum current: $I_{P,sum}$ | max. 4 A |
| Current consumption from $U_P$ | None. $U_P$ is only forwarded. |
| Electrical isolation $GND_S$ / $GND_P$ | no |

| Digital inputs | |
|---|---|
| Number | 16 |
| Connection | 2x pluggable spring-loaded terminal ZS2001<br>(not included) |
| Nominal input voltage | 24 $V_{DC}$ (-15%/+20%) |
| Input filter | 10 µs |
| Signal voltage "0" | -3 … +5 V (EN 61131-2, type 3) |
| Signal voltage "1" | +11 … +30 V (EN 61131-2, type 3) |
| Input current | typically 3 mA (EN 61131-2, type 3) |
| Sensor supply | 24 $V_{DC}$ from $U_S$<br>max. 0.5 A, short-circuit proof in total |

| Housing data | |
|---|---|
| Dimensions W x H x D | 30 mm x 126 mm x 26.5 mm (without connectors) |
| Weight | approx. 165 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C<br>-25…+55 °C according to cURus |
| Ambient temperature during storage | -40…+85 °C |
| Vibration resistance, shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27<br>Additional checks [▶ 44] |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP20 |

| Approvals / markings | |
|---|---|
| Approvals / markings *) | CE, cURus [▶ 98], EAC, UKCA |

*) Real applicable approvals/markings see type plate on the side (product marking).

**Additional checks**

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

## 3.8.3 EP1816-0003 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP1816-0003
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

## 3.8.4 EP1816-0003 - Process image

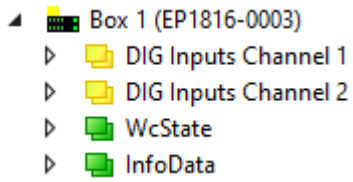
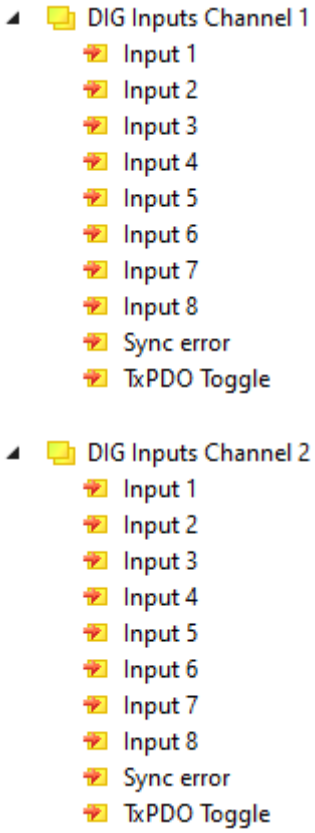



Fig. 19: EP1816-0003 Process image

### DIG Inputs Channel *n*




- Input x
  Digital inputs.
- Sync error
  This bit is only relevant in Distributed Clocks mode.
  It is TRUE if a synchronization error occurred during the elapsed EtherCAT cycle.
- TxPDO Toggle
  This bit is inverted each time the digital inputs are updated.

# 3.9 EP1816-x008

## 3.9.1 EP1816-x008 - Introduction

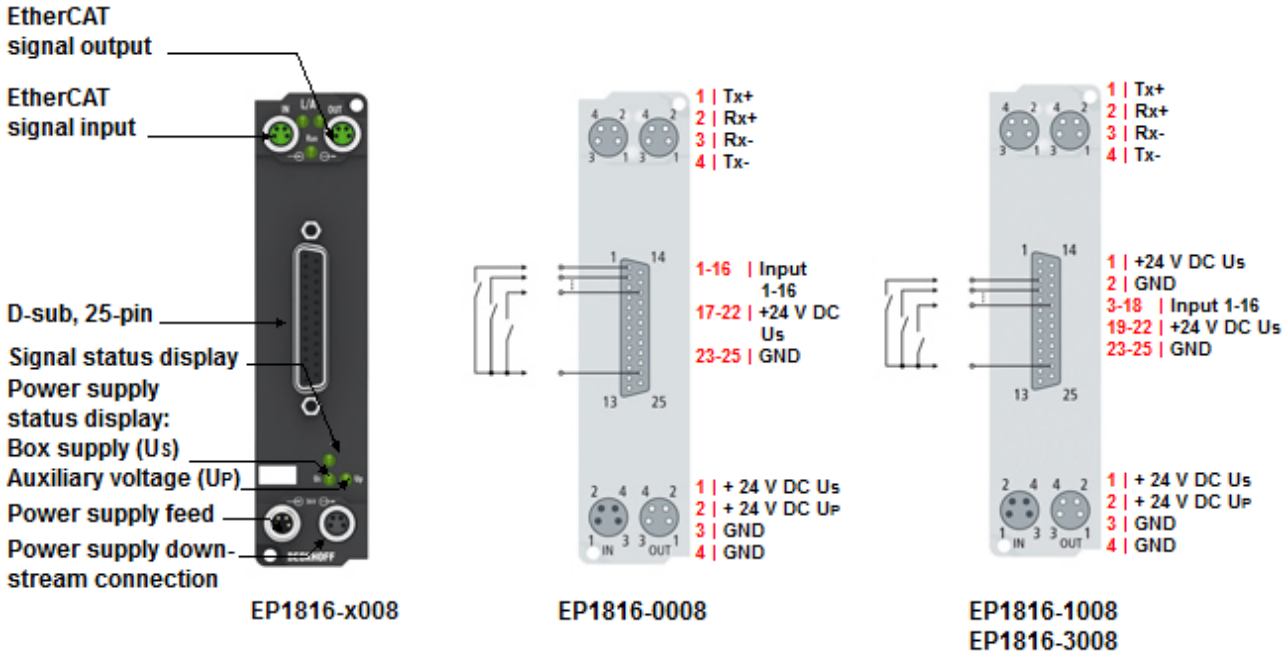



Fig. 20: EP1816-x008

**EP1816-x008 | 16-channel digital input**

The EP1816-x008 EtherCAT Box with digital inputs acquires the binary control signals from the process level and transmits them, in an electrically isolated form, to the controller. The state of the signals is indicated by light emitting diodes. The signals are connected via 25-pin D-sub socket.

The sensors are supplied from the box supply voltage $U_S$. The auxiliary voltage $U_P$ is not used in the input module, but may be connected in order to be relayed downstream.

EP1816-3008 has two internal 3-axis accelerometers with 16 bits and a selectable resolution of ±2 g, ±4 g, ±8 g and ±16 g. The sampling frequency is 1 Hz to 5 KHz. Possible applications include the recording of vibrations and shocks/oscillations, and furthermore inclination measurements in all three axes.

**Quick links**

Technical data [▶ 47]
Process image [▶ 50]
Dimensions [▶ 70]
Signal connection [▶ 94]
Acceleration measurement (EP1816-3008) [▶ 117]
Inclination measurement (EP1816-3008) [▶ 121]

## 3.9.2 EP1816-x008 - Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | EP1816-0008 | EP1816-1008 | EP1816-3008 |
|---|---|---|---|
| Connection | 2x M8 socket, 4-pin, green | | |
| Electrical isolation | 500 V | | |
| Distributed Clocks | yes | | |
| Minimum cycle time | - | - | 500 µs |

| Supply voltages | EP1816-0008 | EP1816-1008 | EP1816-3008 |
|---|---|---|---|
| Connection | Input: M8 connector, 4-pin<br>Downstream connection: M8 socket, 4-pin, black | | |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) | | |
| $U_S$ sum current: $I_{S,sum}$ | max. 4 A | | |
| Current consumption from $U_S$ | 120 mA + sensor supply | | |
| $U_P$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) | | |
| $U_P$ sum current: $I_{P,sum}$ | max. 4 A | | |
| Current consumption from $U_P$ | None. $U_P$ is only forwarded. | | |
| Undervoltage detection | - | < 18 V<br>for $U_S$ and $U_P$ | < 18 V<br>for $U_S$ and $U_P$ |
| Electrical isolation $GND_S$ / $GND_P$ | no | yes | yes |

| Digital inputs | |
|---|---|
| Number | 16 |
| Connection | D-sub socket, 25-pin, UNC4-40 thread |
| Nominal input voltage | 24 $V_{DC}$ (-15%/+20%) |
| Input filter | 10 µs |
| Signal voltage "0" | -3 … +5 V (EN 61131-2, type 3) |
| Signal voltage "1" | +11 … +30 V (EN 61131-2, type 3) |
| Input current | 3 mA (EN 61131-2, type 3) |
| Sensor supply | 24 $V_{DC}$ from $U_S$<br>max. 0.5 A, short-circuit proof in total |

| Housing data | |
|---|---|
| Dimensions W x H x D | 30 mm x 126 mm x 26.5 mm (without connectors) |
| Weight | approx. 165 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C<br>-25...+55 °C according to cURus |
| Ambient temperature during storage | -40…+85 °C |
| Vibration resistance, shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27<br>Additional checks [▶ 48] |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) |

| Approvals / markings | |
|---|---|
| Approvals / markings *) | CE, cURus [▶ 98], EAC, UKCA |

*) Real applicable approvals/markings see type plate on the side (product marking).

**Additional checks**

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

### 3.9.2.1 Accelerometers (EP1816-3008 only)

| Technical data | Accelerometers |
|---|---|
| Sensor type | Two 3-axis accelerometers, offset by 90° |
| Resolution of the measured acceleration values | 10-bit<br>When displayed in mg: 1 mg per LSB [1)] |
| Resolution of the measured inclination values | Depending on where the measured acceleration values are converted to angles of inclination:<br>• 1° when converted in EP1816-3008<br>• < 0.1° when converted in the controller |
| Measuring range of the acceleration measurement | ±2 g / ±4 g / ±8 g / ± 16 g adjustable [1)] |
| Special features | Self-test |
| Sampling rate | 1 Hz to 5 kHz |

[1)] 1 g is the acceleration of gravity, 9.81 m/s$^2$.

**Maximum transfer rate**

EP1816-3008 reads sensors with sampling rates between 1 Hz and 5 kHz. Since the smallest cycle time is limited to 500 µs due to the internal processing, the resulting maximum transfer rate is 2.5 kHz.

### 3.9.3 EP1816-000x - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP1816-000x
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

## 3.9.4 EP1816-0008 - Process image

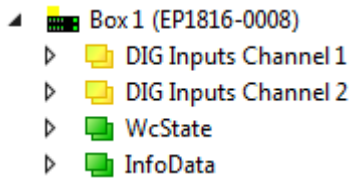



Fig. 21: EP1816-0008 Process image

### DIG Inputs Channel 1

You will find the first 8 digital inputs of the module under **DIG Inputs Channel 1**.

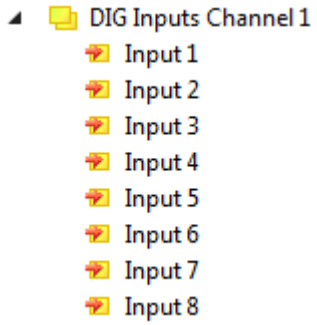



Fig. 22: EP1816-0008 process image, DIG Inputs Channel 1

### DIG Inputs Channel 2

You will find the second 8 digital inputs of the module under **DIG Inputs Channel 2**.

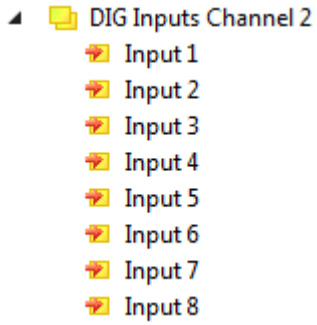



Fig. 23: EP1816-0008 process image, DIG Inputs Channel 2

## 3.9.5 EP1816-1008 – Process image

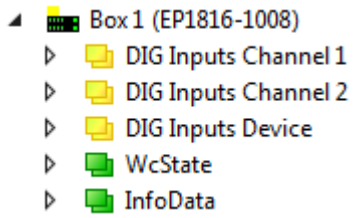



Fig. 24: EP1816-1008 Process image

### DIG Inputs Channel 1

You will find the first 8 digital inputs of the module under **DIG Inputs Channel 1**.

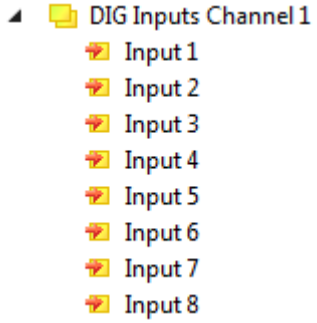



Fig. 25: EP1816-1008 process image, DIG Inputs Channel 1

### DIG Inputs Channel 2

You will find the second 8 digital inputs of the module under **DIG Inputs Channel 2**.

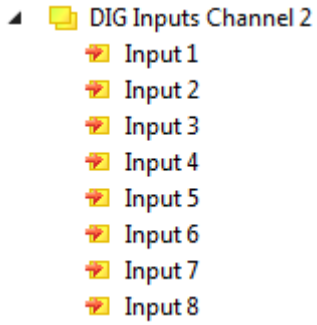



Fig. 26: EP1816-1008 process image, DIG Inputs Channel 2

### DIG Inputs Device

The status bits can be found under **DIG Inputs Device**.

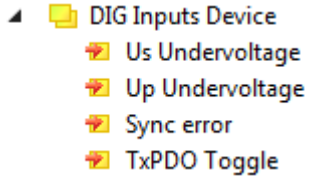



Fig. 27: EP1816-1008 process image, DIG Inputs Device

## 3.9.6 EP1816-3008 - Process image

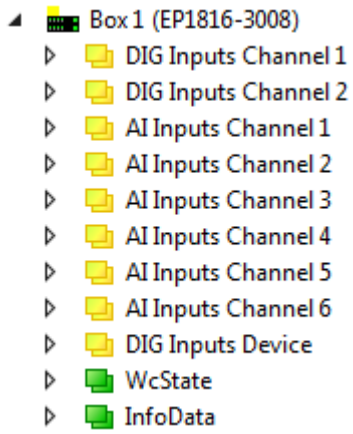



Fig. 28: EP1816-3008 Process image

### DIG Inputs Channel 1

You will find the first 8 digital inputs of the module under **DIG Inputs Channel 1**.

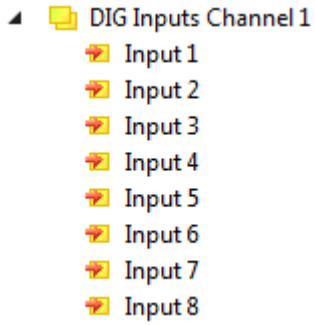



Fig. 29: EP1816-3008 process image, DIG Inputs Channel 1

### DIG Inputs Channel 2

You will find the second 8 digital inputs of the module under **DIG Inputs Channel 2**.

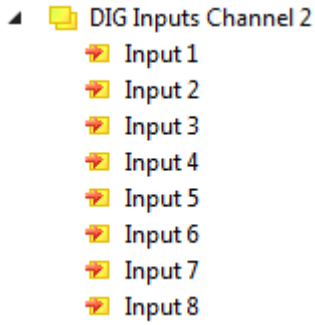



Fig. 30: EP1816-3008 process image, DIG Inputs Channel 2

### DIG Inputs Device

The status bits can be found under **DIG Inputs Device**.

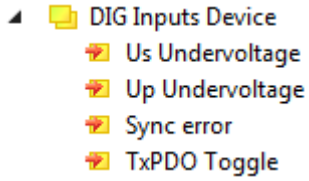



Fig. 31: EP1816-3008 process image, DIG Inputs Device

### AI Inputs Channel 1 to 6

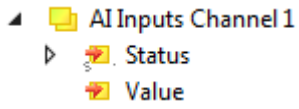



Fig. 32: EP1816-3008 process image, AI inputs

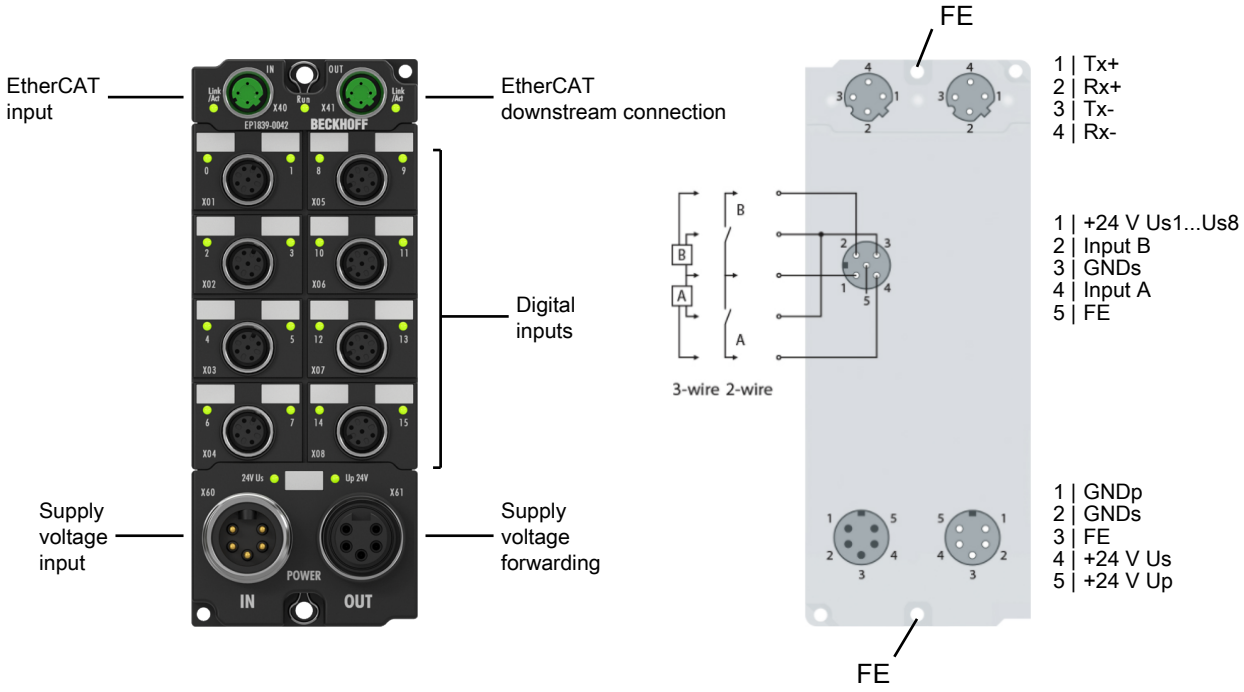
The data for the two accelerometers can be found under **AI inputs Channel**

- Status Error: error relating to the communication with the accelerometer
- Value: 16-bit acceleration value

Assignment of the acceleration axes [▶ 117]

# 3.10 EP1839-0042

## 3.10.1 EP1839-0042 - Introduction




**16-channel digital input with diagnostics**

The EP1839-0042 EtherCAT Box with 16 digital inputs acquires binary control signals from the process level and transfers them, with electrical isolation, to the controller. The signal state is displayed by LEDs; the signals are connected via screwable M12 connectors. A wire break detection can be enabled/disabled for each channel. The signal input filters are individually adjustable.

Each M12 socket has an independent 24 V DC/0.5 A short-circuit proof sensor supply from $U_S$ for the two connected sensors. This is monitored and any errors are reported to the controller via a diagnosis. Module-related undervoltage detection of the input voltage takes place.

The peripheral voltage $U_P$ is not used in the input module, but it can optionally be connected for forwarding and is fed through to the next device. Due to the adjustable input filter and the comprehensive supply and diagnostics logic, the EP1839-0042 is particularly suitable for applications in which a high system availability and thus fast fault-finding and troubleshooting are required.

The EP1839-0042 has M12 D-coded EtherCAT connections and 7/8" connectors for the power supply.

**Special features:**

- adjustable wire break detection per sensor
- Undervoltage detection of the sensor supply $U_S$
- short-circuit proof sensor supply $U_S$ 0.5 A per M12 socket
- parameterizable input filters per signal

The EP1839-0042 is interference-free. You can use the EP1839-0042 instead of an interference-free standard terminal in accordance with the following chapters of the TwinSAFE Application Guide:

- Chapter 4.1 "All-pole disconnection of a potential group with downstream interference-free standard terminals (Category 4, PL e)"

- Chapter 4.2 "Single-pole disconnection of a potential group with downstream interference-free standard terminals with fault exclusion (Category 4, PL e)"
- Chapter 4.3 "EL2911 potential group with interference-free standard terminals (Category 4, PL e)"

**Quick links**

Technical data [▶ 56]
Process image [▶ 58]
Dimensions [▶ 72]
Signal connection and status LEDs [▶ 89]

Configure inputs [▶ 107]
Configure sensor supply [▶ 113]

## 3.10.2 EP1839-0042 - Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2x M12 socket, 4-pin, D-coded |
| Electrical isolation | 500 V |
| Distributed Clocks | yes |

| Supply voltages | |
|---|---|
| Connection input | 7/8“ connector, 5-pin, black |
| Downstream connection | 7/8“ socket, 5-pin, black |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_S$ sum current: $I_{S,sum}$ | max. 16 A at 40 °C |
| Current consumption from $U_S$ | 130 mA + sensor supply $U_{S1}$ … $U_{S8}$ |
| $U_P$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_P$ sum current: $I_{P,sum}$ | max. 16 A at 40 °C |
| Current consumption from $U_P$ | None. $U_P$ is only forwarded. |
| Diagnostics | $U_S$ undervoltage detection |

| Digital inputs | |
|---|---|
| Number | 16 |
| Connection | 8 x M12 socket |
| Cable length | max. 30 m from the box to the sensor |
| Input filter | Adjustable: 0 … 3 ms |
| Characteristics | Type 3 according to EN61131-2, compatible with type 1 |
| Signal voltage "0" | -3 … +5 V |
| Signal voltage "1" | +11 … +30 V |
| Input current | 3 mA |
| Sensor supply $U_{S1}$ … $U_{S8}$ | 24 $V_{DC}$ from $U_S$.<br>Max. 0.5 A per M12 socket, individually short-circuit proof. |
| Diagnostics | • Wire break detection<br>• Sensor supply |

| Housing data | |
|---|---|
| Dimensions W x H x D | 60 mm x 150 mm x 26,5 mm (without connectors) |
| Weight | approx. 440 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C |
| Ambient temperature during storage | -40…+85 °C |
| Vibration / shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27 |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 conforms to EN 60529 |

| Approvals/markings | |
|---|---|
| Approvals/markings *) | CE, EAC, UKCA, UL under preparation |

*) Real applicable approvals/markings see type plate on the side (product marking).

**Additional checks**

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

## 3.10.3 EP1839-0042 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EP1839-0042
- 2x protective cap for EtherCAT socket, M12 (pre-assembled)
- 1x Protective cap for supply voltage output, 7/8”, black (pre-fitted)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

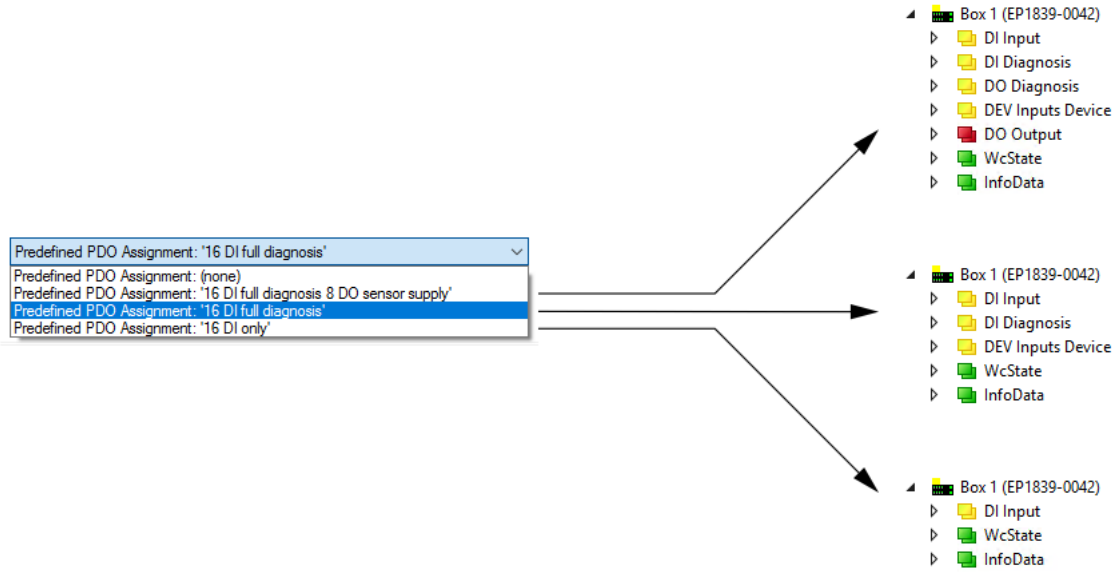
Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

## 3.10.4 EP1839-0042 - Process image

You can choose between several predefined variants of the process image, the "Predefined PDO Assignments". The procedure for setting a Predefined PDO Assignment can be found in chapter Adapt process image (EP1839-0042 only) [▶ 105].

In the factory setting, the Predefined PDO Assignment "16 DI full diagnosis" is selected.

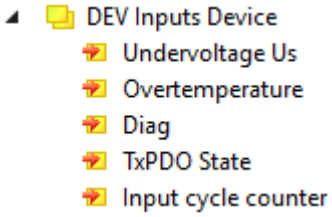



The individual process data objects are described in chapter Process data objects [▶ 59].

### 3.10.4.1 Process data objects

**DEV Inputs Device**

"DEV Inputs Device" contains status bits for diagnostic messages that affect the entire EP1839-0042 device.




**Undervoltage Us**
Undervoltage of the supply voltage $U_S$.
As a result, all sensor supply outputs are switched off.

**Overtemperature**
Internal overtemperature. All sensor supply outputs are deactivated.
The bit is reset and the sensor supply outputs are automatically reactivated when the temperature has dropped again.

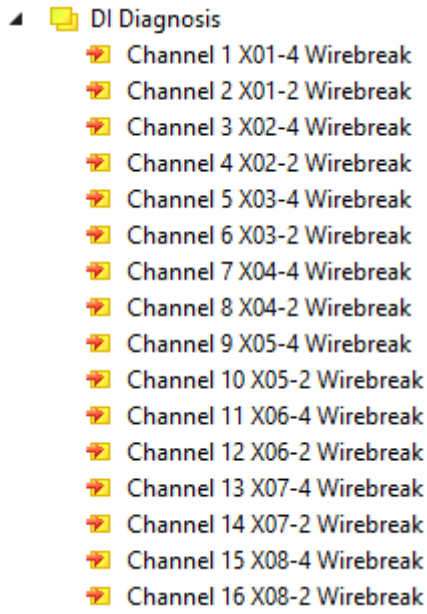
**Diag**
Without function. Reserved for future use.

**TxPDO State**
Validity of the input data. This bit is set if the input data could not be read correctly due to an error.

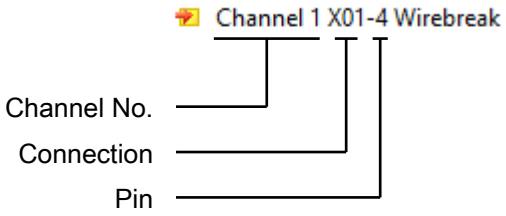
**Input cycle counter**
A 2-bit counter. It is incremented each time the input data is updated in the process image. After it reaches its maximum value of 3, it jumps back to 0.

### DI Diagnosis

"DI Diagnosis" contains the status bits for the digital inputs. The status bits indicate a wire break. See chapter Wire break detection [▶ 111].

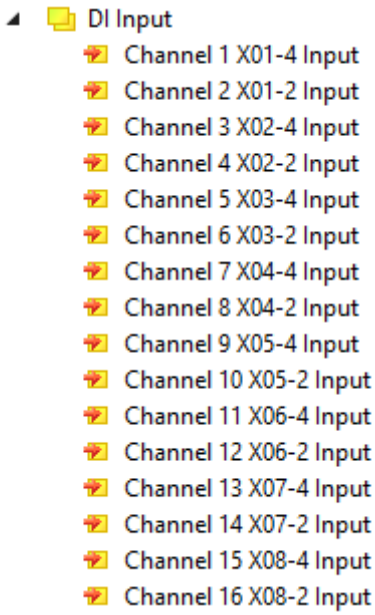



The variable names are structured as follows:

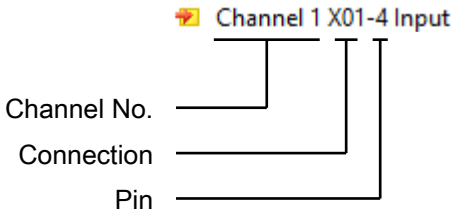


### DI Input

"DI Input" contains the input variables of the digital inputs.



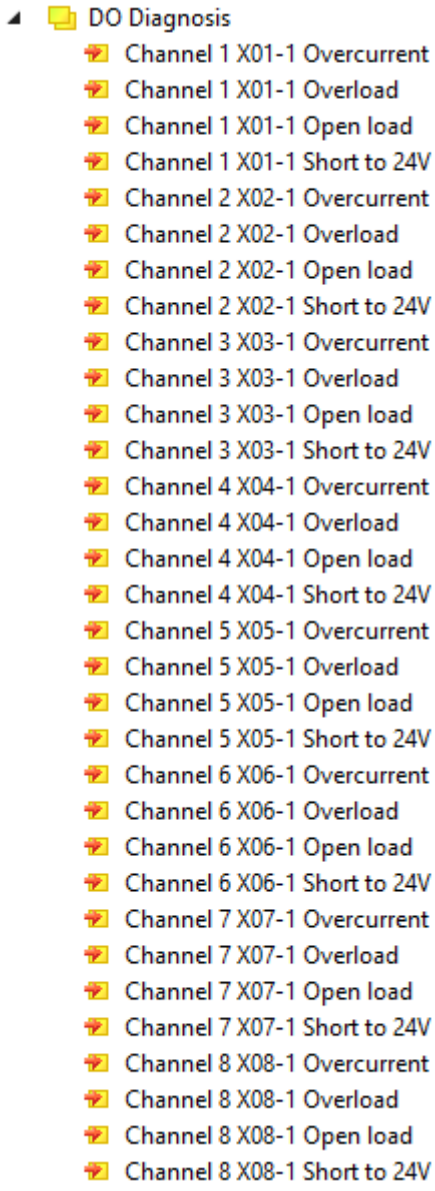

The variable names are structured as follows:



### DO Diagnosis

"DO Diagnosis" contains the status bits for the sensor supply outputs.

This process data object is deactivated in the factory setting. You can enable it by setting the Predefined PDO Assignment "16 DI full diagnosis 8 DO sensor supply", see chapter Adapt process image (EP1839-0042 only) [▶ 105].



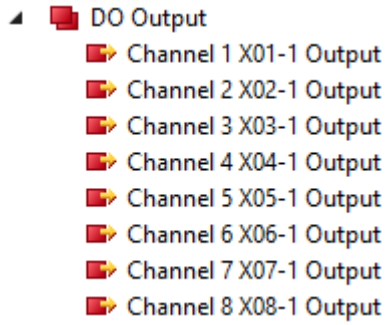

If an error is detected at a sensor supply output, the error is additionally signaled by the status LEDs at the corresponding connection. See chapter EP1839-00x2 [▶ 89].

See chapter Configure sensor supply (EP1839-0042 only) [▶ 113] for further information.

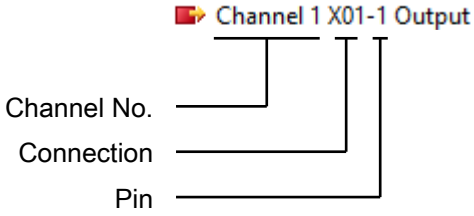
### DO Output

"DO Output" contains the output variables of the digital outputs.

This process data object is deactivated in the factory setting. You can enable it by setting the Predefined PDO Assignment "16 DI full diagnosis 8 DO sensor supply", see chapter Adapt process image (EP1839-0042 only) [▶ 105].




The variable names are structured as follows:



# 3.11 EP1859-0042

## 3.11.1 EP1859-0042 - Introduction

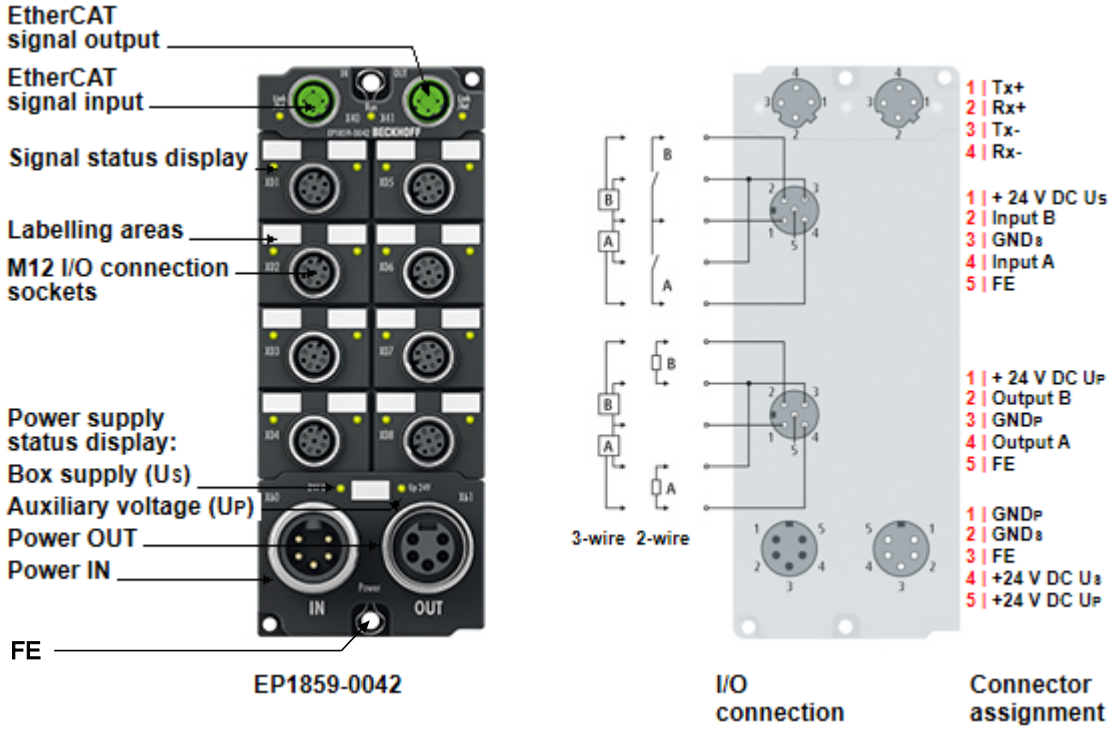
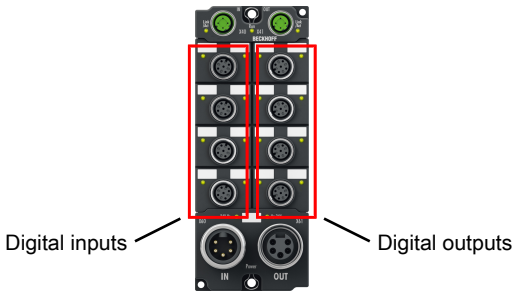



Fig. 33: EP1859-0042

**8 x digital input + 8 x digital output 24 $V_{DC}$, Imax = 0.5 A, 3.0 ms**

The EP1859-0042 EtherCAT Box has eight digital inputs (four M12 sockets on the left) and eight digital outputs (four M12 sockets on the right).




The inputs have a filter of 3.0 ms. The outputs process load currents up to 0.5 A, are short-circuit proof and protected against polarity reversal. The state of the signals is indicated by light emitting diodes. The signals are connected via M12 screw type connectors.

The sensors are supplied from the box supply voltage $U_S$. The outputs are supplied via $U_P$. The outputs are short-circuit proof and protected against inverse connection.

The EP1859-0042 is interference-free. You can use the EP1859-0042 instead of an interference-free standard terminal in accordance with the following chapters of the TwinSAFE Application Guide:

- Chapter 4.1 "All-pole disconnection of a potential group with downstream interference-free standard terminals (Category 4, PL e)"
- Chapter 4.2 "Single-pole disconnection of a potential group with downstream interference-free standard terminals with fault exclusion (Category 4, PL e)"
- Chapter 4.3 "EL2911 potential group with interference-free standard terminals (Category 4, PL e)"

**Quick links**

Technical data [▶ 66]
Process image [▶ 69]
Dimensions [▶ 72]
Functional earth (FE) [▶ 74]
Signal connection for inputs [▶ 87]: X01, X02, X03, X04
Signal connection for outputs [▶ 97]: X05, X06, X07, X08

## 3.11.2 EP1859-0042 - Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

| EtherCAT | |
|---|---|
| Connection | 2x M12 socket, 4-pin, D-coded |
| Electrical isolation | 500 V |

| Supply voltages | |
|---|---|
| Connection | Input: 7/8" - plug, 5-pin<br>Downstream connection: 7/8" - socket, 5-pin |
| $U_S$ nominal voltage | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_S$ sum current | max. 16 A at 40 °C |
| Current consumption from $U_S$ | 120 mA |
| Rated voltage $U_P$ | 24 $V_{DC}$ (-15 % / +20 %) |
| $U_P$ sum current | max. 16 A at 40 °C |
| Current consumption from $U_P$ | 20 mA + load |

| Digital inputs | |
|---|---|
| Number | 8 |
| Connection | 4x M12 socket: X01, X02, X03, X04 |
| Nominal input voltage | 24 $V_{DC}$ (-15%/+20%) |
| Input filter | 3 ms |
| Signal voltage "0" | -3...+5 V (similar to EN 61131-2, type 3) |
| Signal voltage "1" | +11...+30 V (similar to EN 61131-2, type 3) |
| Input current | 6 mA (similar to EN 61131-2, type 3) |
| Sensor supply | from the control voltage $U_S$<br>max. 0.5 A in total, short-circuit proof |

| Digital outputs | |
|---|---|
| Number | 8 |
| Connection | 4x M12 socket: X05, X06, X07, X08 |
| Output current | max. 0.5 A per channel, individually short-circuit proof |
| Load type | Ohmic, inductive, lamp load |
| Auxiliary voltage output | from $U_P$<br>max. 0.5 A in total, short-circuit proof |

| Housing data | |
|---|---|
| Dimensions W x H x D | 60 mm x 150 mm x 26,5 mm (without connectors) |
| Weight | approx. 440 g |
| Installation position | variable |
| Material | PA6 (polyamide) |

| Environmental conditions | |
|---|---|
| Ambient temperature during operation | -25…+60 °C |
| Ambient temperature during storage | -40…+85 °C |
| Vibration / shock resistance | conforms to EN 60068-2-6 / EN 60068-2-27 |
| EMC immunity / emission | conforms to EN 61000-6-2 / EN 61000-6-4 |
| Protection class | IP65, IP66, IP67 conforms to EN 60529 |

| Approvals/markings | |
|---|---|
| Approvals/markings *) | CE, EAC, UKCA, UL under preparation |

*) Real applicable approvals/markings see type plate on the side (product marking).

### Additional checks

The boxes have been subjected to the following checks:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency sweeps in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

### 3.11.3 EP1859-0042 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP1859-0042
- 2x protective cap for EtherCAT socket, M12 (pre-assembled)
- 1x Protective cap for supply voltage output, 7/8”, black (pre-fitted)
- 10x labels, blank (1 strip of 10)

**Pre-assembled protective caps do not ensure IP67 protection**

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

### 3.11.4 EP1859-0042 - Process image

The process image contains a process data object for each digital input.

The name of each process data object contains the name of the socket and the pin number of the corresponding digital input.

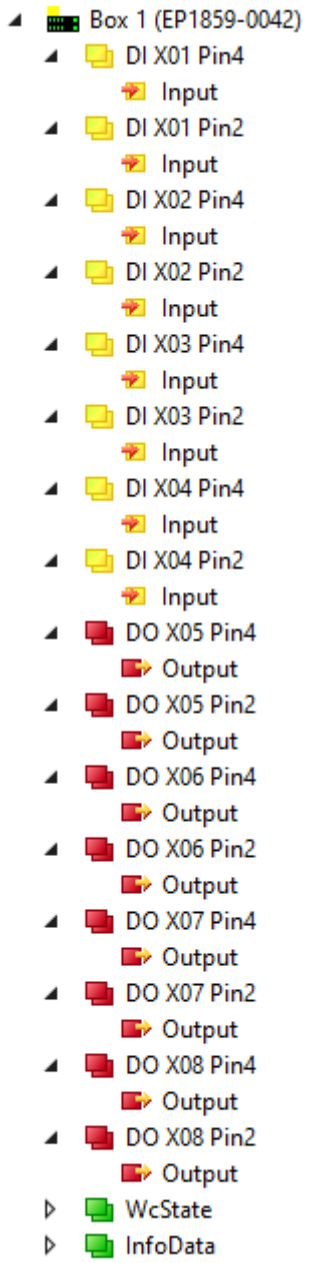
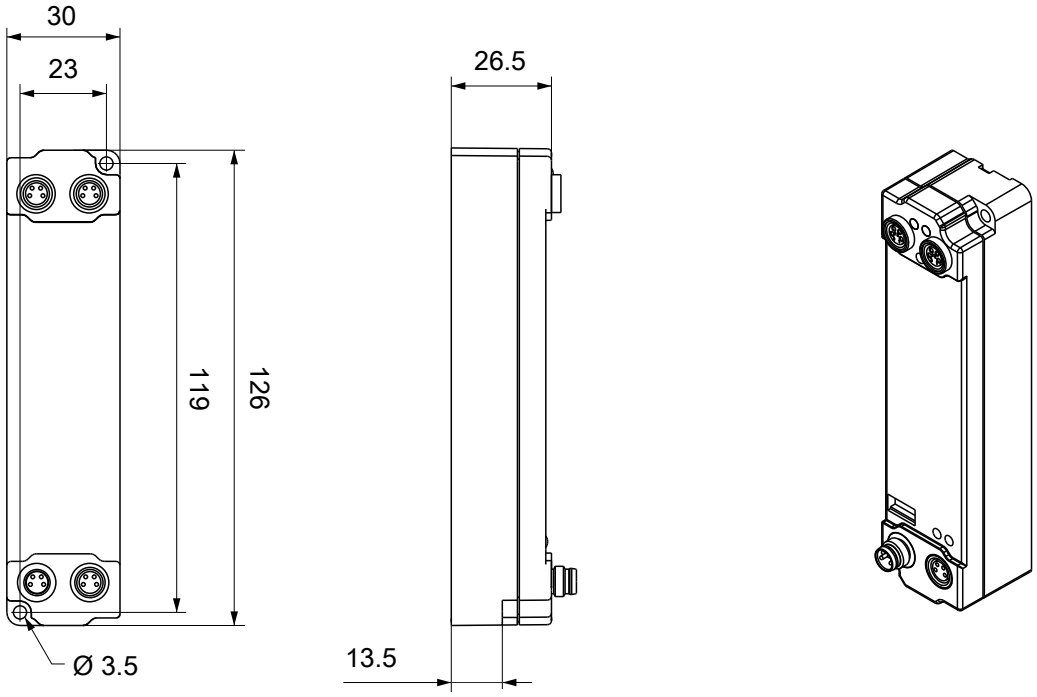



Fig. 34: EP1859-0042 - Process image

# 4 Mounting and connection

## 4.1 Mounting

### 4.1.1 Dimensions EPxxxx-xx0x and EPxxxx-xx1x

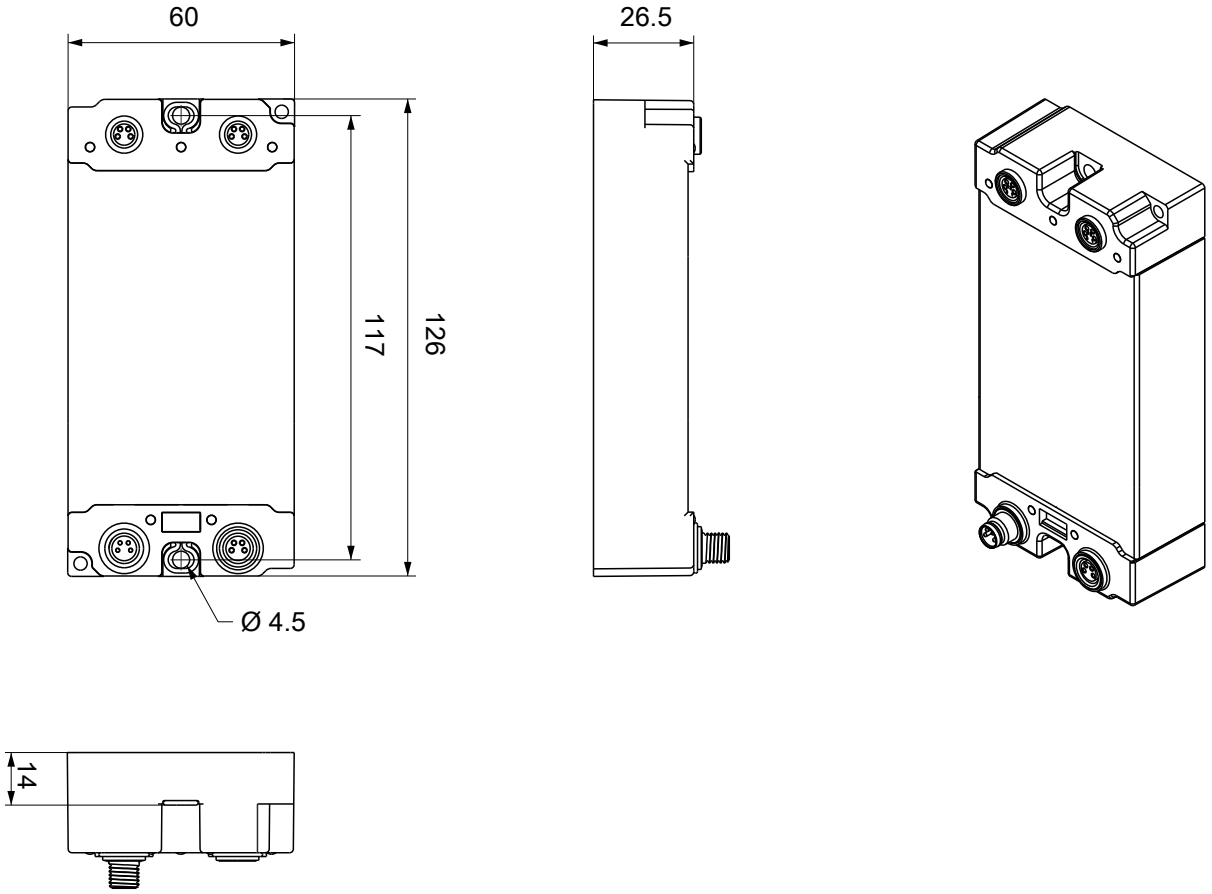



All dimensions are given in millimeters.
The drawing is not true to scale.

**Housing features**

| | |
|---|---|
| Housing material | PA6 (polyamide) |
| Sealing compound | polyurethane |
| Mounting | two fastening holes Ø 3.5 mm for M3 |
| Metal parts | brass, nickel-plated |
| Contacts | CuZn, gold-plated |
| Power feed through | max. 4 A |
| Installation position | variable |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) when screwed together |
| Dimensions (H x W x D) | approx. 126 x 30 x 26.5 mm (without connectors) |

## 4.1.2 Dimensions EPxxxx-xx2x

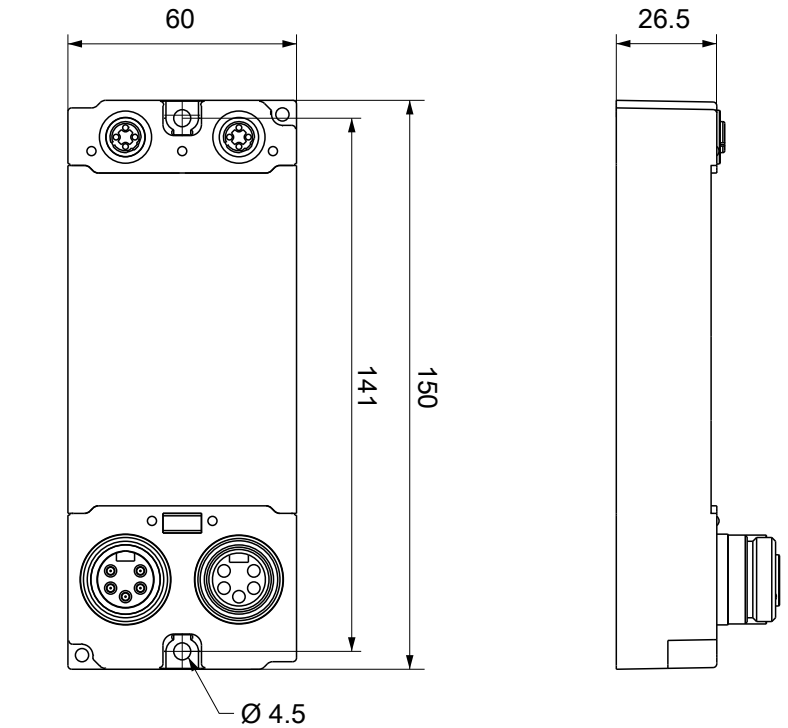


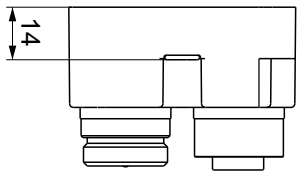

All dimensions are given in millimeters.
The drawing is not true to scale.

### Housing features

| | |
|---|---|
| Housing material | PA6 (polyamide) |
| Sealing compound | polyurethane |
| Mounting | two fastening holes Ø 4.5 mm for M4 |
| Metal parts | brass, nickel-plated |
| Contacts | CuZn, gold-plated |
| Installation position | variable |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) when screwed together |
| Dimensions (H x W x D) | approx. 126 x 60 x 26.5 mm (without connectors) |

## 4.1.3 EPxxxx-xx42 dimensions




All dimensions are given in millimeters.
The drawing is not true to scale.

### Housing features

| | |
|---|---|
| Housing material | PA6 (polyamide) |
| Sealing compound | polyurethane |
| Mounting | two fastening holes Ø 4.5 mm for M4 |
| Metal parts | brass, nickel-plated |
| Contacts | CuZn, gold-plated |
| Power feed through | max. 16 A at 40°C (according to IEC 60512-3) |
| Installation position | variable |
| Protection class | IP65, IP66, IP67 (conforms to EN 60529) when screwed together |
| Dimensions (H x W x D) | approx. 150 x 60 x 26.5 mm (without connectors) |

## 4.1.4 Fixing

**Protection of connectors against contamination!**

While mounting the modules, protect all connectors, especially the IP-Link, against contamination! Only with connected cables or plugs the protection class IP67 is guaranteed! Unused connectors have to be protected with the right plugs! See for plug sets in the catalogue.

Modules with narrow housing are mounted with two M3 bolts.
Modules with wide housing are mounted with two M3 bolts to the fixing holes located at the corners or mounted with two M4 bolts to the fixing holes located centrally.

The bolts must be longer than 15 mm. The fixing holes of the modules are not threaded.

When assembling, remember that the fieldbus connectors increases the overall height. See chapter accessories.

### Mounting Rail ZS5300-0001

The mounting rail ZS5300-0001 (500 mm x 129 mm) allows the time saving assembly of modules.

The rail is made of stainless steel, 1.5 mm thick, with already pre-made M3 threads for the modules. The rail has got 5.3 mm slots to mount it via M5 screws to the machine.

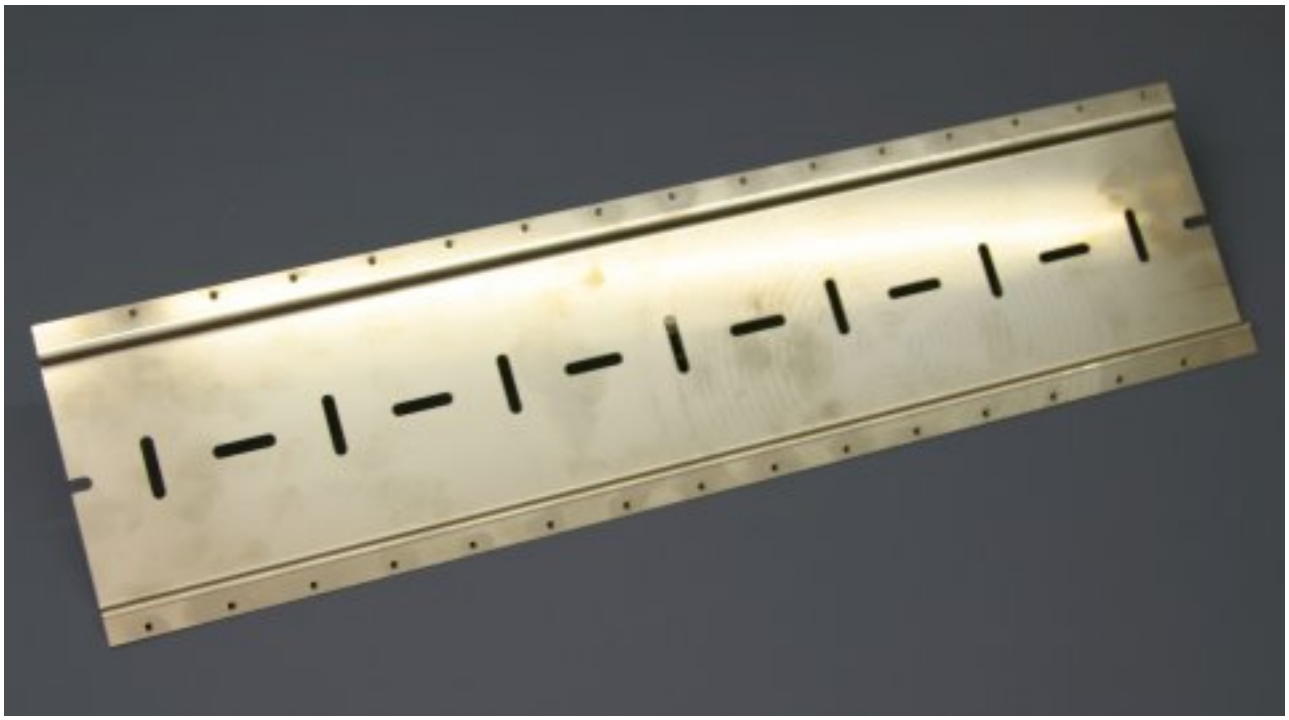


Fig. 35: Mounting Rail ZS5300-000

The mounting rail is 500 mm long, that way 15 narrow modules can be mounted with a distance of 2 mm between two modules. The rail can be cut to length for the application.

### Mounting Rail ZS5300-0011

The mounting rail ZS5300-0011 (500 mm x 129 mm) has in addition to the M3 treads also pre-made M4 treads to fix 60 mm wide modules via their middle holes.

Up to 14 narrow or 7 wide modules may be mixed mounted.

### 4.1.5 Functional earth (FE)

EtherCAT Box modules of types EPxxxx-002x and EPxxxx-0042 must be grounded:

The fastening holes also serve as connections for the functional earth (FE).

Make sure that the box is earthed with low impedance via both fastening screws. You can achieve this, for example, by mounting the box on a grounded machine bed.

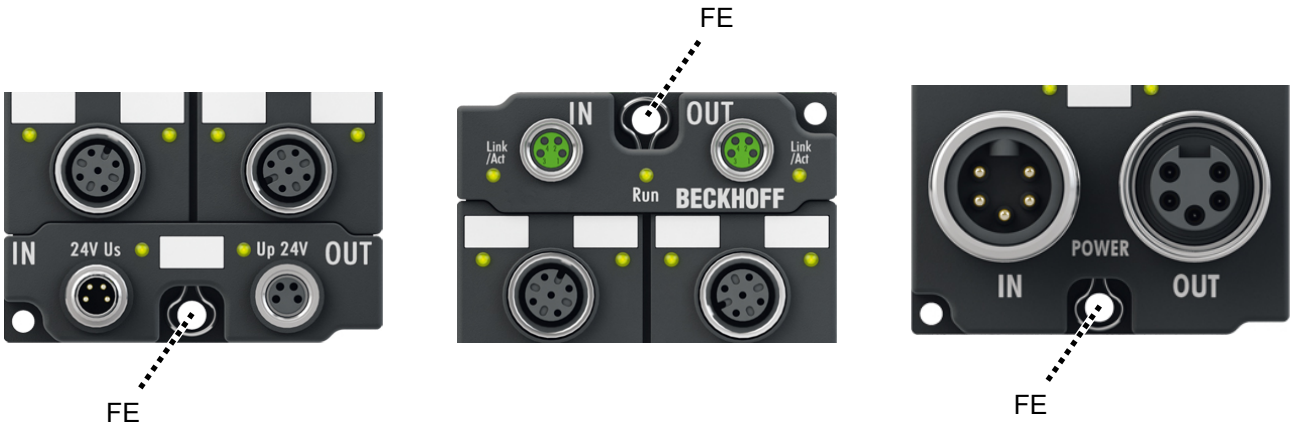



Fig. 36: Functional earth via the fastening holes

### 4.1.6 Additional checks

The boxes have undergone the following additional tests:

| Verification | Explanation |
|---|---|
| Vibration | 10 frequency runs in 3 axes |
| | 5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude |
| | 60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude |
| Shocks | 1000 shocks in each direction, in 3 axes |
| | 35 g, 11 ms |

# 4.2 Connections

## 4.2.1 Tightening torques for plug connectors

Screw connectors tight with a torque wrench. (e.g. ZB8801 from Beckhoff)

| Connector diameter | Tightening torque |
|---|---|
| M8 | 0.4 Nm |
| M12 | 0.6 Nm |
| 7/8” | 1.5 Nm |

## 4.2.2 Protective caps

- Seal unused connectors with protective caps.
- Ensure the correct seating of pre-assembled protective caps.
  Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

## 4.2.3 EtherCAT

### 4.2.3.1 Connectors

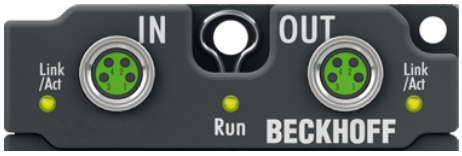
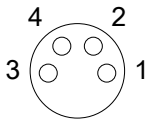
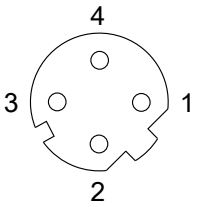
**NOTE**

**Risk of confusion: supply voltages and EtherCAT**

Defect possible through incorrect insertion.

- Observe the color coding of the connectors:
  black: Supply voltages
  green: EtherCAT

EtherCAT Box modules have two green M8 or M12 sockets for the incoming and outgoing EtherCAT connections.

| M8 sockets | | M12 sockets |
|---|---|---|
|  |  |  |
|  | |  |

**Assignment**

There are various different standards for the assignment and colors of connectors and cables for EtherCAT.

| EtherCAT | Plug connector | | | Cable | | Standard |
|---|---|---|---|---|---|---|
| Signal | M8 | M12 | RJ45[1] | ZB9010, ZB9020, ZB9030, ZB9032, ZK1090-6292, ZK1090-3xxx-xxxx | ZB9031 and old versions of ZB9030, ZB9032, ZK1090-3xxx-xxxx | TIA-568B |
| Tx + | Pin 1 | Pin 1 | Pin 1 | yellow[2] | orange/white[3] | white/orange |
| Tx - | Pin 4 | Pin 3 | Pin 2 | orange[2] | orange[3] | orange |
| Rx + | Pin 2 | Pin 2 | Pin 3 | white[2] | blue/white[3] | white/green |
| Rx - | Pin 3 | Pin 4 | Pin 6 | blue[2] | blue[3] | green |
| Shield | Housing | | Shroud | Shield | Shield | Shield |

[1]) colored markings according to EN 61918 in the four-pin RJ45 connector ZS1090-0003
[2]) wire colors according to EN 61918
[3]) wire colors

**Assimilation of color coding for cable ZB9030, ZB9032 and ZK1090-3xxxx-xxxx (with M8 connectors)**

For unification, the prevalent cables ZB9030, ZB9032 and ZK1090-3xxx-xxxx were changed to the colors of EN61918 (yellow, orange, white, blue). So different color coding exists. But the electrical properties are absolutely identical.

### 4.2.3.2 Status LEDs


**L/A (Link/Act)**

A green LED labelled "L/A" is located next to each EtherCAT socket. The LED indicates the communication state of the respective socket:

| LED | Meaning |
|---|---|
| off | no connection to the connected EtherCAT device |
| lit | LINK: connection to the connected EtherCAT device |
| flashes | ACT: communication with the connected EtherCAT device |

**Run**

Each EtherCAT slave has a green LED labelled "Run". The LED signals the status of the slave in the EtherCAT network:

| LED | Meaning |
|---|---|
| off | Slave is in "Init" state |
| flashes uniformly | Slave is in "Pre-Operational“ state |
| flashes sporadically | Slave is in "Safe-Operational" state |
| lit | Slave is in "Operational" state |

Description of the EtherCAT slave states

### 4.2.3.3 Cables

For connecting EtherCAT devices only shielded Ethernet cables that meet the requirements of at least category 5 (CAT5) according to EN 50173 or ISO/IEC 11801 should be used.

EtherCAT uses four wires for signal transmission.
Thanks to automatic line detection ("Auto MDI-X"), both symmetrical (1:1) or cross-over cables can be used between Beckhoff EtherCAT.

Detailed recommendations for the cabling of EtherCAT devices

## 4.2.4 Supply voltages

The EtherCAT Box is supplied with two supply voltages.

- **Control voltage $U_S$**
  Power is supplied to the fieldbus, the processor logic, the inputs and the sensors from the control voltage $U_S$.
- **Peripheral voltage $U_P$**
  The peripheral voltage $U_P$ supplies the digital outputs; it can be brought in separately. Hence, if the peripheral voltage is switched off, the fieldbus function as well as the supply and function of the inputs are retained.

### Redirection of the supply voltages

The power IN and OUT connections are bridged in the module. Hence, the supply voltages $U_s$ and $U_p$ can be passed from EtherCAT Box to EtherCAT Box in a simple manner.

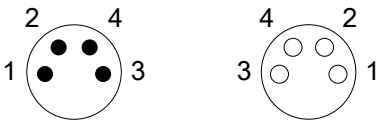
**NOTE**

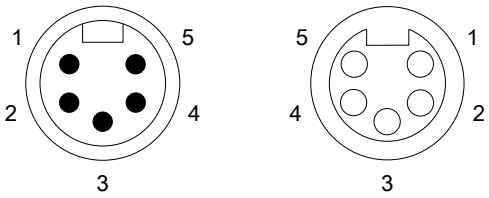
**Note the maximum current!**

Ensure that the permitted current for the connectors is not exceeded when routing the supply voltages $U_S$ and $U_P$:

M8 connector: max. 4 A
7/8" connector: max 16 A

### 4.2.4.1 Connectors

<table>
<tr><th>M8 connector</th><th>7/8" connector</th></tr>
<tr><td colspan="2"> 
</td><td> 
</td></tr>
<tr><td colspan="2"> 

Plug<br>Input<br><br>Socket<br>Forwarding</td><td> 

Plug<br>Feed-in<br><br>Socket<br>Forwarding</td></tr>
</table>

| Function | M8 | 7/8" | Description | Core color [1] |
|---|---|---|---|---|
| $U_S$ | 1 | 4 | Control voltage | Brown |
| $U_P$ | 2 | 5 | Peripheral voltage | White |
| $GND_S$ | 3 | 2 | GND to $U_S$ | Blue |
| $GND_P$ | 4 | 1 | GND to $U_P$ | Black |
| FE | - | 3 | Functional earth | Grey |

[1] The core colors apply to cables of the type: Beckhoff ZK2020-xxxx-xxxx

$GND_S$ and $GND_P$ are linked for modules of the following types:

- EPxxxx-0001
- EPxxxx-0002
- EPxxxx-0008

**NOTE**

**The electrical isolation between $GND_S$ and $GND_P$ can be removed**

In some EtherCAT Box modules the ground potentials $GND_S$ and $GND_P$ are linked.

If several EtherCAT Box modules are supplied with the same electrically isolated voltages, check whether there is an EtherCAT Box among them in which the ground potentials are linked.

### 4.2.4.2 Status LEDs


Fig. 37: Status LEDs for the supply voltages

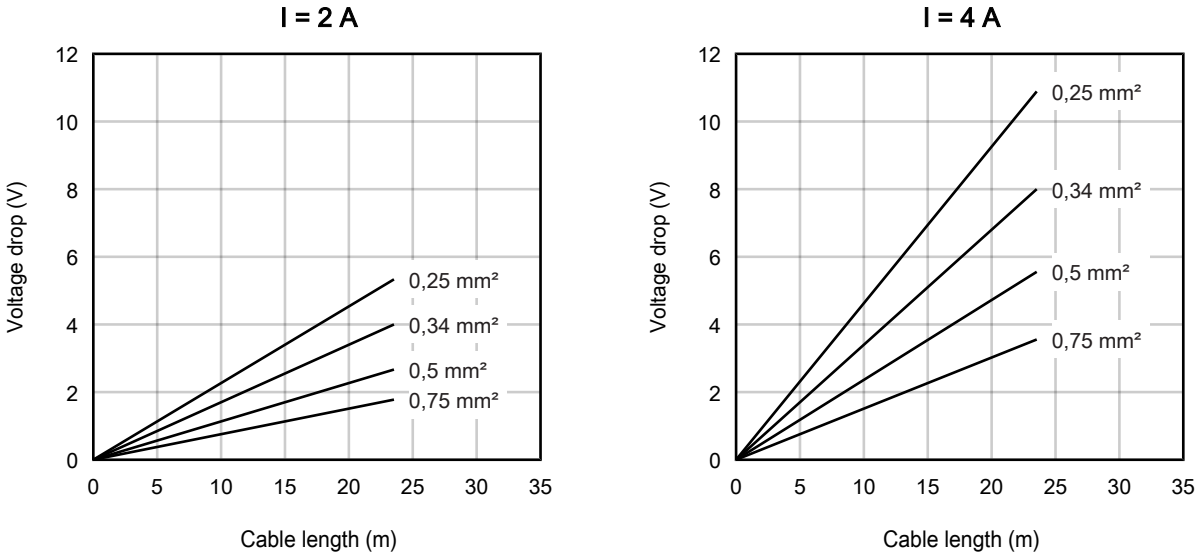
| LED | Display | Meaning |
|---|---|---|
| $U_S$ (control voltage) | off | The supply voltage $U_S$ is not available. |
| | green illuminated | The supply voltage $U_S$ is available. |
| | red illuminated | Red illumination of this LED has different meanings for different products:<br>• EP1839-0042: Undervoltage of the supply voltage $U_S$.<br>• Other products: Sensor supply overload.<br>In both cases all sensor supply outputs were switched off. |
| $U_P$ (peripheral voltage) | off | The supply voltage $U_P$ is not available. |
| | green illuminated | The supply voltage $U_P$ is available. |
| | red illuminated (EP1859-0042 only) | Due to overload (current > 0.5 A), the sensor supply generated from the supply voltage $U_P$ was switched off for all sensors supplied from it. |

### 4.2.4.3 Conductor losses

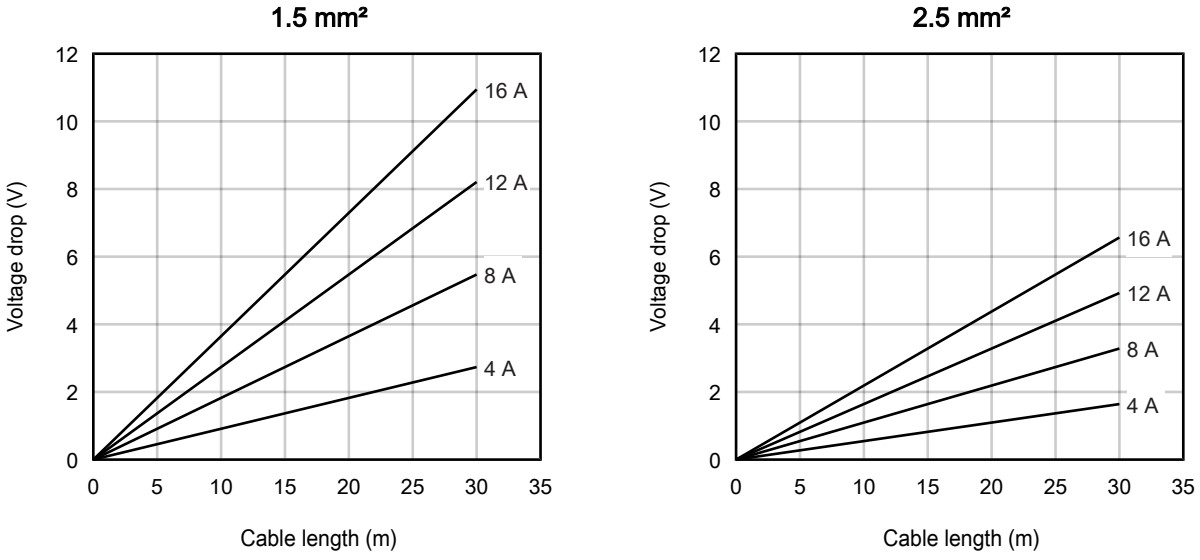
Take into account the voltage drop on the supply line when planning a system. Avoid the voltage drop being so high that the supply voltage at the box lies below the minimum nominal voltage.

Variations in the voltage of the power supply unit must also be taken into account.

**Voltage drop on cables with M8 connectors**




**Voltage drop on cables with 7/8" connectors**



## 4.2.5 Digital inputs

### 4.2.5.1 M8 sockets

**Pin assignment**

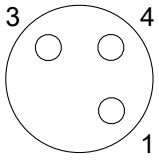



Fig. 38: M8 socket, 3-pin

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{S1}$ [2] | brown |
| 3 | $GND_S$ | blue |
| 4 | Input | black |

[1] The wire colors apply to 3-wire M8 cables from Beckhoff: ZK2000-2xxx

[2] $U_{S1}$ serves as sensor supply voltage. It is branched off from the $U_S$ supply voltage.

**Connection examples**

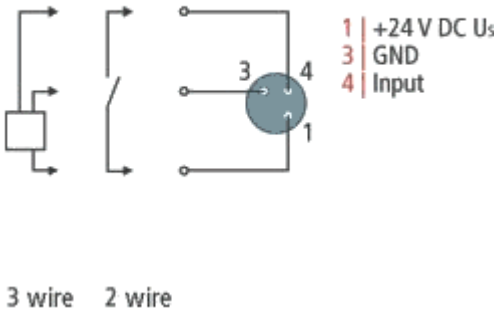



Fig. 39: Digital inputs M8, connection examples

**Status LEDs**

There is a green LED next to each M8 socket. The LED lights up when a high level is detected at the digital input.

Fig. 40: Status LED at an M8 socket

#### 4.2.5.2 M12 sockets

Several EtherCAT Box modules with M12 sockets are described in this documentation. The M12 sockets of different EtherCAT Box modules have different pin assignments.

Select the correct EtherCAT Box from the following list:

EP1008-0002 [▶ 84]

EP1008-0022 [▶ 85]

EP1018-0002 [▶ 84]

EP1258-0002 [▶ 84]

EP1809-0022 [▶ 86]

EP1809-0042 [▶ 87]

EP1819-0022 [▶ 88]

EP1839-0022 [▶ 89]

EP1839-0042 [▶ 89]

EP1859-0042 [▶ 91]

#### 4.2.5.2.1 EP1xxx-0002

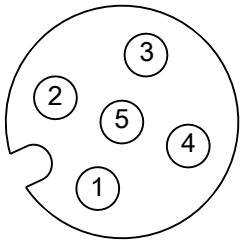



Fig. 41: M12 socket

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{S1}$ [2] | brown |
| 2 | Input B | white |
| 3 | $GND_S$ | blue |
| 4 | Input A | black |
| 5 | - | grey |

[1] The core colors apply to M12 cables from Beckhoff: ZK2000-5xxx, ZK2000-6xxx, ZK2000-7xxx

[2] $U_{S1}$ serves as sensor supply voltage. It is branched off from the $U_S$ supply voltage.

**Connection examples**

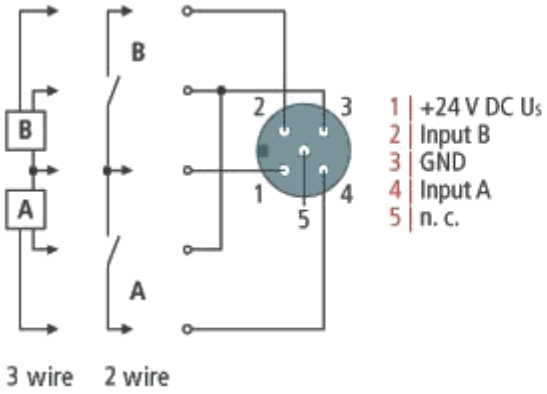
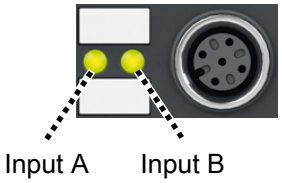



Fig. 42: Digital inputs M12, connection examples

**Status LEDs**

Each M12 socket has two green LEDs. An LED lights up when a high level is detected at the respective input.



#### 4.2.5.2.2 EP1008-0022

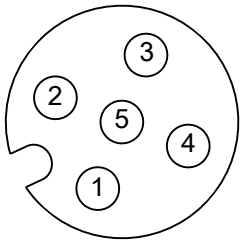



Fig. 43: M12 socket

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{S1}$ [2] | brown |
| 2 | - | white |
| 3 | $GND_S$ | blue |
| 4 | Input | black |
| 5 | - | gray |

[1] The core colors apply to M12 cables from Beckhoff: ZK2000-5xxx, ZK2000-6xxx, ZK2000-7xxx

[2] $U_{S1}$ serves as sensor supply voltage. It is branched off from the $U_S$ supply voltage.

**Connection examples**

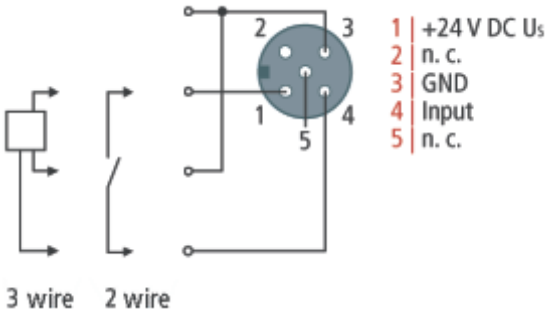



Fig. 44: Digital inputs M12, connection examples

**Status LEDs**

Each M12 socket has a green LED. The LED lights up when a high level is detected at the digital input.

Fig. 45: Status LED on an M12 socket for EP1008-0022

### 4.2.5.2.3 EP1809-0022

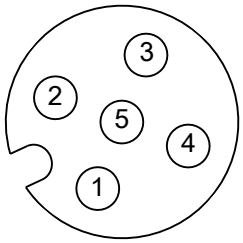



Fig. 46: M12 socket

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{S1}$ [2] | brown |
| 2 | Input B | white |
| 3 | $GND_S$ | blue |
| 4 | Input A | black |
| 5 | - | grey |

[1] The core colors apply to M12 cables from Beckhoff: ZK2000-5xxx, ZK2000-6xxx, ZK2000-7xxx

[2] $U_{S1}$ serves as sensor supply voltage. It is branched off from the $U_S$ supply voltage.

**Connection examples**

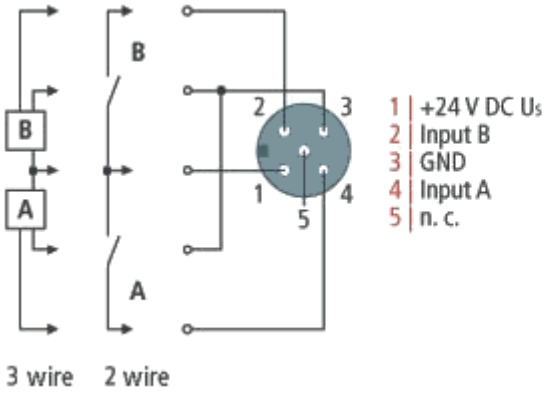



Fig. 47: Digital inputs M12, connection examples

**Status LEDs**

Each M12 socket has two green LEDs. An LED lights up when a high level is detected at the respective input.


Fig. 48: Status LEDs of M12 sockets

#### 4.2.5.2.4 EP1809-0042

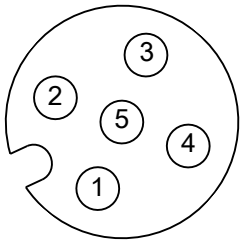



Fig. 49: M12 socket

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{S1}$ [2] | brown |
| 2 | Input B | white |
| 3 | $GND_S$ | blue |
| 4 | Input A | black |
| 5 | FE (Functional earth) | gray |

[1] The core colors apply to M12 cables from Beckhoff: ZK2000-5xxx, ZK2000-6xxx, ZK2000-7xxx

[2] $U_{S1}$ serves as sensor supply voltage. It is branched off from the $U_S$ supply voltage.

**Connection examples**

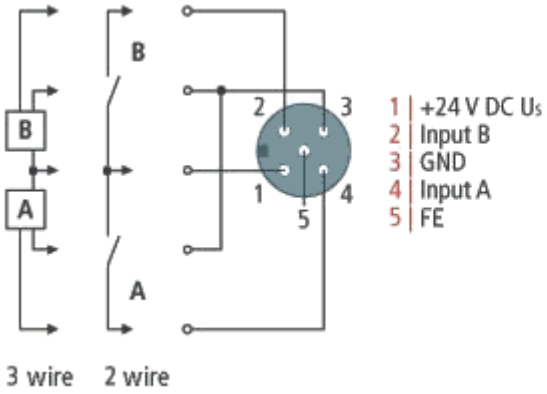



Fig. 50: Digital inputs M12, connection examples

**Status LEDs**

Each M12 socket has two green LEDs. An LED lights up when a high level is detected at the respective input.


Fig. 51: Status LEDs of M12 sockets

#### 4.2.5.2.5 EP1819-0022

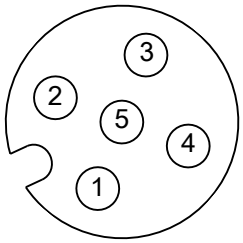



Fig. 52: M12 socket

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{S1}$ [2] | brown |
| 2 | Input B | white |
| 3 | $GND_S$ | blue |
| 4 | Input A | black |
| 5 | - | grey |

[1] The core colors apply to M12 cables from Beckhoff: ZK2000-5xxx, ZK2000-6xxx, ZK2000-7xxx

[2] $U_{S1}$ serves as sensor supply voltage. It is branched off from the $U_S$ supply voltage.

**Connection examples**

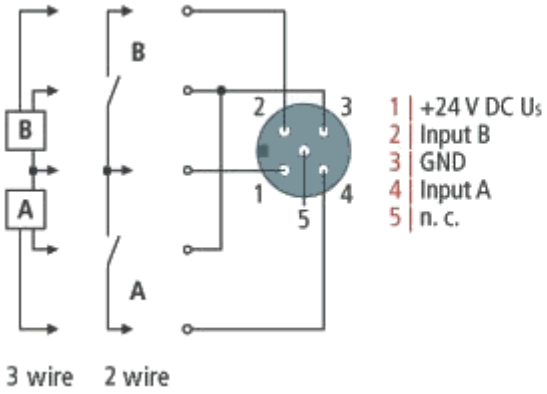



Fig. 53: Digital inputs M12, connection examples

**Status LEDs**

Each M12 socket has two green LEDs. An LED lights up when a high level is detected at the respective input.


Fig. 54: Status LEDs of M12 sockets

### 4.2.5.2.6 EP1839-00x2

**NOTE**

**Maximum cable length: 30 m**

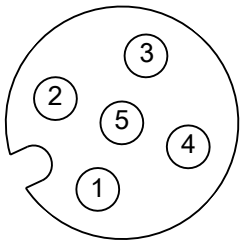



Fig. 55: M12 socket

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{S1}$ … $U_{S8}$ [2] | brown |
| 2 | Input B | white |
| 3 | $GND_S$ | blue |
| 4 | Input A | black |
| 5 | FE (Functional earth) | gray |

[1] The core colors apply to M12 cables from Beckhoff: ZK2000-5xxx, ZK2000-6xxx, ZK2000-7xxx

[2] Sensor supply: The output voltages $U_{S1}$ … $U_{S8}$ are branched off from the supply voltage $U_S$. Each output is independently short-circuit proof.

#### Connection examples

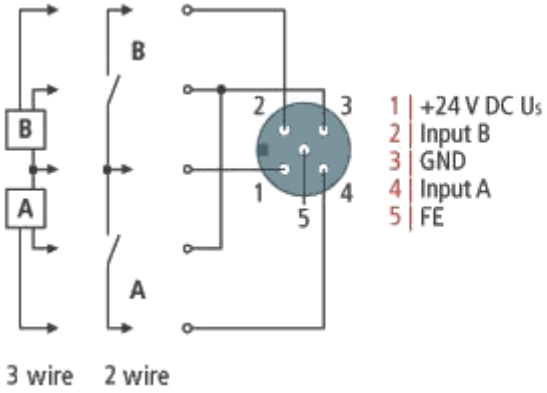



Fig. 56: Digital inputs M12, connection examples

#### Status LEDs

Each M12 socket has two status LEDs.

| Light signal of a status LED | Meaning |
|---|---|
| green illuminated | The input signal is logical high. |
| red illuminated | Wire breakage. See chapter Wire break detection [▶ 111]. |
| both LEDs light up red | Two possibilities:<br>• Sensor supply error. See chapter Configure sensor supply (EP1839-0042 only) [▶ 113].<br>• Wire break at both inputs. See chapter Wire break detection [▶ 111]. |

### 4.2.5.2.7 EP1859-0042

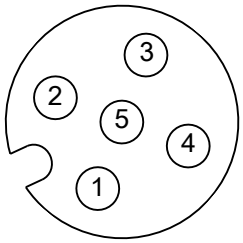



Fig. 57: M12 socket

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{S1}$ [2] | brown |
| 2 | Input B | white |
| 3 | $GND_S$ | blue |
| 4 | Input A | black |
| 5 | FE (Functional earth) | gray |

[1] The core colors apply to M12 cables from Beckhoff: ZK2000-5xxx, ZK2000-6xxx, ZK2000-7xxx

[2] $U_{S1}$ serves as sensor supply voltage. It is branched off from the $U_S$ supply voltage.

#### Connection examples

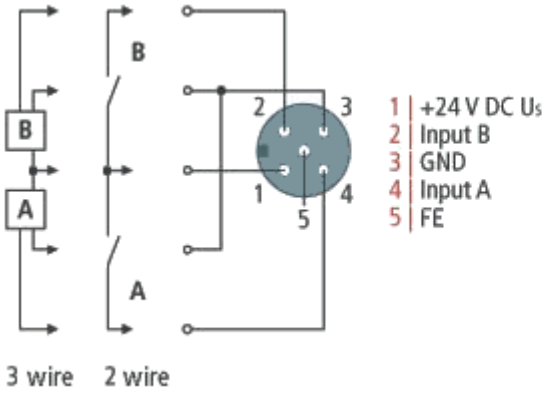



Fig. 58: Digital inputs M12, connection examples

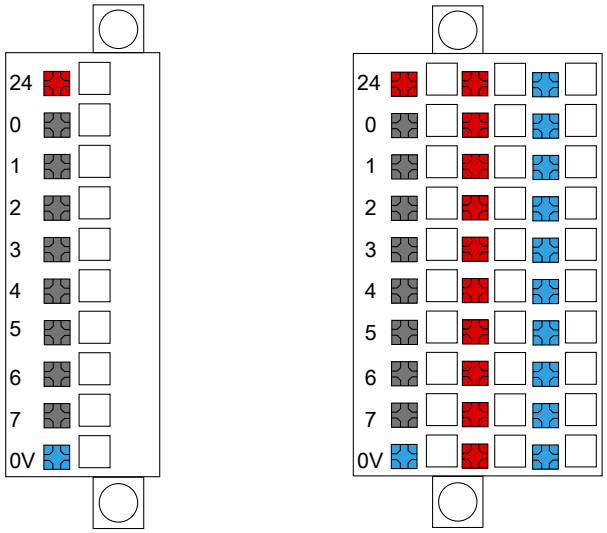
#### Status LEDs

Each M12 socket has two green LEDs. An LED lights up when a high level is detected at the respective input.


Fig. 59: Status LEDs of M12 sockets

### 4.2.5.3 Pluggable spring-loaded terminals

**Pin assignment**




ZS2001-0001
ZS2001-0002

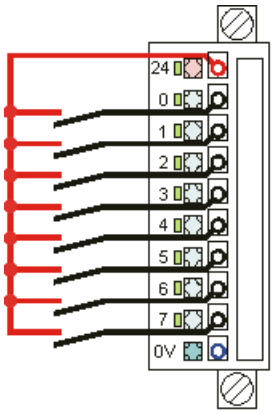
ZS2001-0004

Fig. 60: ZS2001

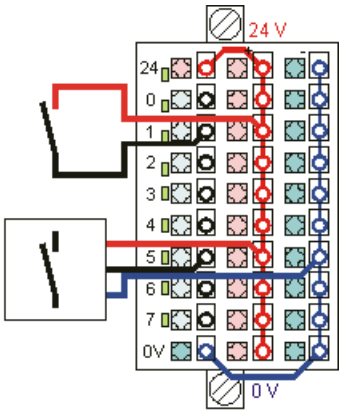
| Contact | Function |
|---|---|
| 0 | Input 1 |
| 1 | Input 2 |
| 2 | Input 3 |
| 3 | Input 4 |
| 4 | Input 5 |
| 5 | Input 6 |
| 6 | Input 7 |
| 7 | Input 8 |
| "24" | $U_{S1}$ |
| "0V" | $GND_S$ |

ZS2001-0004 has three rows with ten terminal contacts each. The first row is occupied as shown in the table. The second and third rows are designed to distribute the supply voltage and ground. See connection examples:

### Connection examples




ZS2001-0002
ZS2001-0001




ZS2001-0004

The diagram shows the connection of 8 sensors in single-wire technology as well as one sensor each in two-wire and three-wire technology.
Please note for ZS2001-0004 connectors: two bridges (24 V and 0 V) are required to supply the terminal points for two- and three-wire connection technology.

### Status LEDs

ZS2001-0002 and ZS2001-0004 have a green status LED for each digital input. An LED lights up when a high level is detected at the corresponding input.

### 4.2.5.4 D-sub sockets, 25-pin

**Pin assignment**

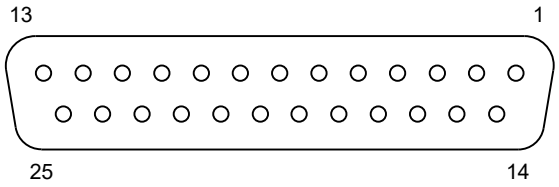


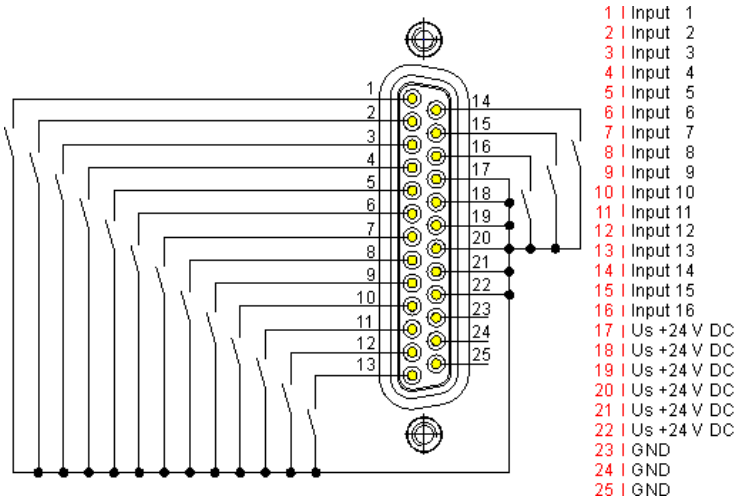

Fig. 61: D-sub socket, 25-pin

| Pin | EP1816-0008 | EP1816-1008 | EP1816-3008 |
|---|---|---|---|
| 1 | Channel 1, Input 1 | $U_{S1}$ [1] | $U_{S1}$ [1] |
| 2 | Channel 1, Input 2 | $GND_S$ | $GND_S$ |
| 3 | Channel 1, Input 3 | Channel 1, Input 1 | Channel 1, Input 1 |
| 4 | Channel 1, Input 4 | Channel 1, Input 2 | Channel 1, Input 2 |
| 5 | Channel 1, Input 5 | Channel 1, Input 3 | Channel 1, Input 3 |
| 6 | Channel 1, Input 6 | Channel 1, Input 4 | Channel 1, Input 4 |
| 7 | Channel 1, Input 7 | Channel 1, Input 5 | Channel 1, Input 5 |
| 8 | Channel 1, Input 8 | Channel 1, Input 6 | Channel 1, Input 6 |
| 9 | Channel 2, Input 1 | Channel 1, Input 7 | Channel 1, Input 7 |
| 10 | Channel 2, Input 2 | Channel 1, Input 8 | Channel 1, Input 8 |
| 11 | Channel 2, Input 3 | Channel 2, Input 1 | Channel 2, Input 1 |
| 12 | Channel 2, Input 4 | Channel 2, Input 2 | Channel 2, Input 2 |
| 13 | Channel 2, Input 5 | Channel 2, Input 3 | Channel 2, Input 3 |
| 14 | Channel 2, Input 6 | Channel 2, Input 4 | Channel 2, Input 4 |
| 15 | Channel 2, Input 7 | Channel 2, Input 5 | Channel 2, Input 5 |
| 16 | Channel 2, Input 8 | Channel 2, Input 6 | Channel 2, Input 6 |
| 17 | $U_{S1}$ [1] | Channel 2, Input 7 | Channel 2, Input 7 |
| 18 | $U_{S1}$ [1] | Channel 2, Input 8 | Channel 2, Input 8 |
| 19 | $U_{S1}$ [1] | $U_{S1}$ [1] | $U_{S1}$ [1] |
| 20 | $U_{S1}$ [1] | $U_{S1}$ [1] | $U_{S1}$ [1] |
| 21 | $U_{S1}$ [1] | $U_{S1}$ [1] | $U_{S1}$ [1] |
| 22 | $U_{S1}$ [1] | $U_{S1}$ [1] | $U_{S1}$ [1] |
| 23 | $GND_S$ | $GND_S$ | $GND_S$ |
| 24 | $GND_S$ | $GND_S$ | $GND_S$ |
| 25 | $GND_S$ | $GND_S$ | $GND_S$ |

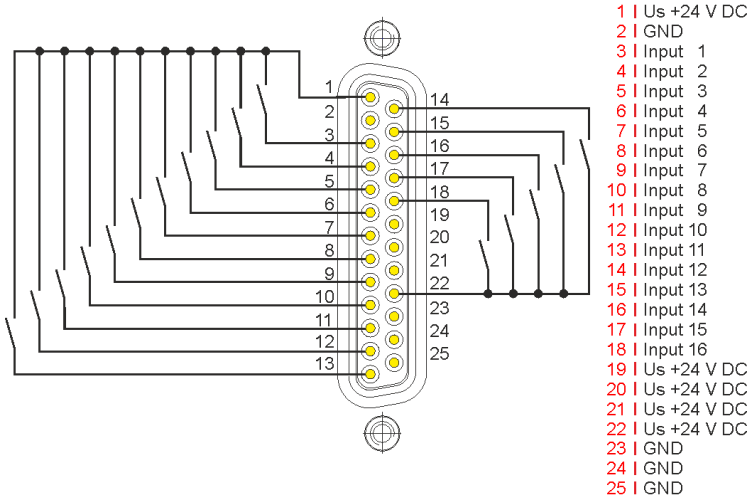
[1] $U_{S1}$ serves as sensor supply voltage. It is branched off from the $U_S$ supply voltage.

## Connection examples

EP1816-0008




EP1816-1008




EP1816-3008

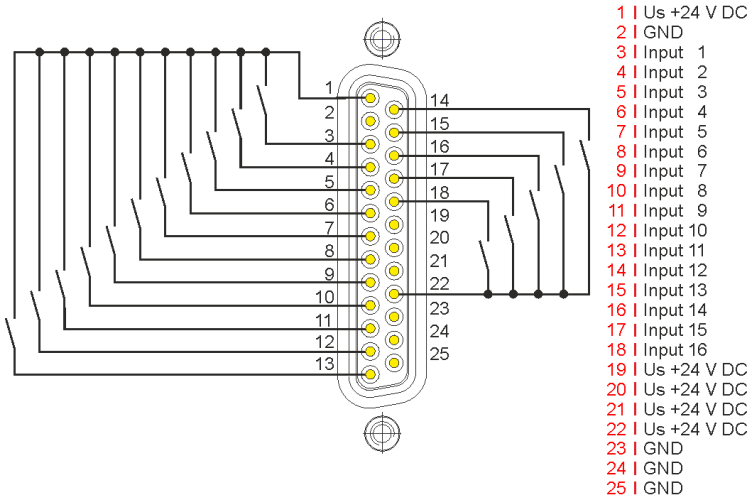



Fig. 62: Digital inputs D-sub, connection examples

### Status LEDs

The D-sub socket has two green status LEDs.


Fig. 63: D-sub 25 status LEDs

## 4.2.6 Digital outputs (EP1859-0042 only)

### 4.2.6.1 M12 sockets

**Pin assignment**

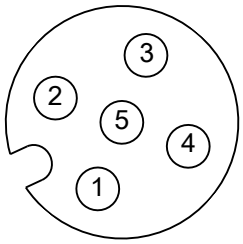



Fig. 64: M12 socket

| Pin | Function | Core color [1] |
|---|---|---|
| 1 | $U_{P1}$ [2] | brown |
| 2 | Output B | white |
| 3 | $GND_P$ | blue |
| 4 | Output A | black |
| 5 | FE (Functional earth) | grey |

[1] The core colors apply to M12 cables from Beckhoff: ZK2000-5xxx, ZK2000-6xxx, ZK2000-7xxx

[2] $U_{P1}$ serves as actuator supply voltage. It is branched off from the $U_P$ supply voltage.

**Connection examples**

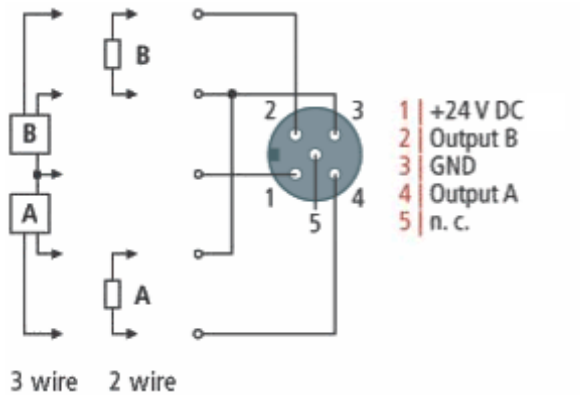



Fig. 65: Digital outputs M12, connection examples

**Status LEDs**

LEDs indicate the signal state of the outputs.

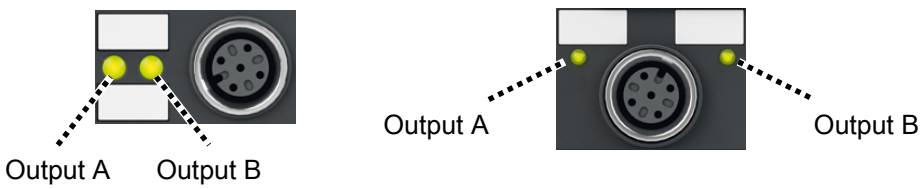



Fig. 66: Status LEDs of M12 sockets

## 4.3 UL Requirements

The installation of the EtherCAT Box Modules certified by UL has to meet the following requirements.

### Supply voltage

**⚠ CAUTION**

**CAUTION!**

This UL requirements are valid for all supply voltages of all marked EtherCAT Box Modules!
For the compliance of the UL requirements the EtherCAT Box Modules should only be supplied

- by a 24 $V_{DC}$ supply voltage, supplied by an isolating source and protected by means of a fuse (in accordance with UL248), rated maximum 4 Amp, or
- by a 24 $V_{DC}$ power source, that has to satisfy *NEC class 2*.
  A *NEC class 2* power supply shall not be connected in series or parallel with another (class 2) power source!

**⚠ CAUTION**

**CAUTION!**

To meet the UL requirements, the EtherCAT Box Modules must not be connected to unlimited power sources!

### Networks

**⚠ CAUTION**

**CAUTION!**

To meet the UL requirements, EtherCAT Box Modules must not be connected to telecommunication networks!

### Ambient temperature range

**⚠ CAUTION**

**CAUTION!**

To meet the UL requirements, EtherCAT Box Modules has to be operated only at an ambient temperature range of -25 °C to +55 °C!

### Marking for UL

All EtherCAT Box Modules certified by UL (Underwriters Laboratories) are marked with the following label.


Fig. 67: UL label

# 4.4 ATEX notes

## 4.4.1 ATEX - Special conditions

**⚠ WARNING**

**Observe the special conditions for the intended use of EtherCAT Box modules in potentially explosive areas – directive 94/9/EU.**

- The certified components are to be installed with a BG2000-0000 or BG2000-0010 protection enclosure [▶ 100] that guarantees a protection against mechanical hazards!
- If the temperatures during rated operation are higher than 70°C at the feed-in points of cables, lines or pipes, or higher than 80°C at the wire branching points, then cables must be selected whose temperature data correspond to the actual measured temperature values!
- Observe the permissible ambient temperature range of 0 to 55°C for the use of EtherCAT Box modules in potentially explosive areas!
- Measures must be taken to protect against the rated operating voltage being exceeded by more than 40% due to short-term interference voltages!
- The connections of the certified components may only be connected or disconnected if the supply voltage has been switched off or if a non-explosive atmosphere is ensured!

### Standards

The fundamental health and safety requirements are fulfilled by compliance with the following standards:

- EN 60079-0: 2006
- EN 60079-15: 2005

### Marking

The EtherCAT Box modules certified for potentially explosive areas bear the following marking:

**II 3 G Ex nA II T4 DEKRA 11ATEX0080 X Ta: 0 - 55°C**

or

**II 3 G Ex nA nC IIC T4 DEKRA 11ATEX0080 X Ta: 0 - 55°C**

### Batch number (D number)

The EtherCAT Box modules bear a batch number (D number) that is structured as follows:

D: WW YY FF HH

WW - week of production (calendar week)
YY - year of production
FF - firmware version
HH - hardware version

Example with batch number 29 10 02 01:

29 - week of production 29
10 - year of production 2010
02 - firmware version 02
01 - hardware version 01

## 4.4.2 BG2000 - EtherCAT Box protection enclosures

**⚠ WARNING**

**Risk of electric shock and damage of device!**

Bring the EtherCAT system into a safe, powered down state before starting installation, disassembly or wiring of the modules!

### ATEX

**⚠ WARNING**

**Mount a protection enclosure!**

To fulfill the special conditions according to ATEX [▶ 99], a BG2000-0000 or BG2000-0010 protection enclosure has to be mounted over the EtherCAT Box.

### Installation

Put the cables for EtherCAT, power supply and sensors/actuators through the hole of the protection enclosure.

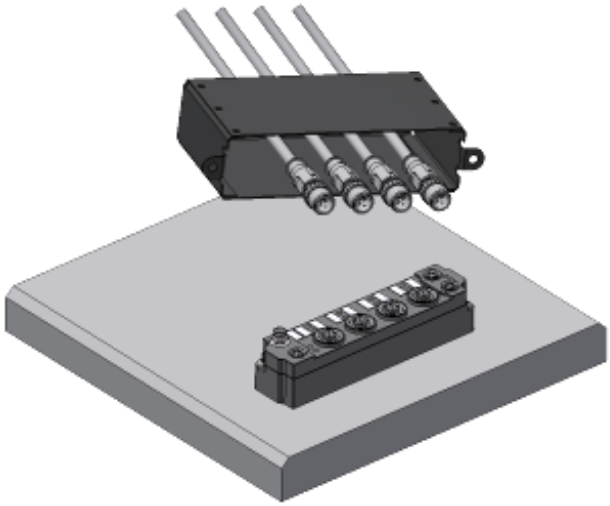


Fig. 68: BG2000 - putting the cables

Fix the wires for EtherCAT, power supply and sensors/actuators to the EtherCAT Box.

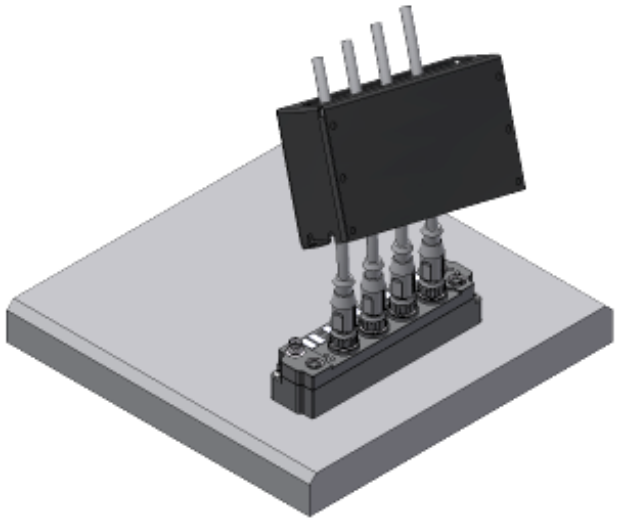


Fig. 69: BG2000 - fixing the cables

Mount the protection enclosure over the EtherCAT Box.

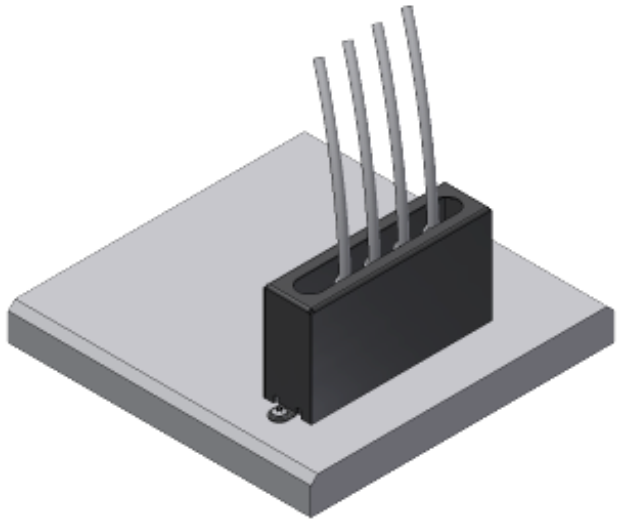


Fig. 70: BG2000 - mounting the protection enclosure

## 4.4.3 ATEX Documentation

**Notes about operation of EtherCAT Box Modules (EPxxxx-xxxx) in potentially explosive areas (ATEX)**

Pay also attention to the continuative documentationNotes about operation of EtherCAT Box Modules (EPxxxx-xxxx) in potentially explosive areas (ATEX) that is available in the download area of the Beckhoff homepage http:\\www.beckhoff.com!

## 4.5 Disposal

Products marked with a crossed-out wheeled bin shall not be discarded with the normal waste stream. The device is considered as waste electrical and electronic equipment. The national regulations for the disposal of waste electrical and electronic equipment must be observed.

# 5 Commissioning and configuration

## 5.1 Integration in TwinCAT

The procedure for integration in TwinCAT is described in this Quick start guide.

## 5.2 Setting the Hot Connect ID (EP1111-0000 only)

The units, tens and hundreds digits of the ID each have their own ID switch. The ID switches are labelled accordingly:

- X 1
- X 10
- X 100

**Sample**

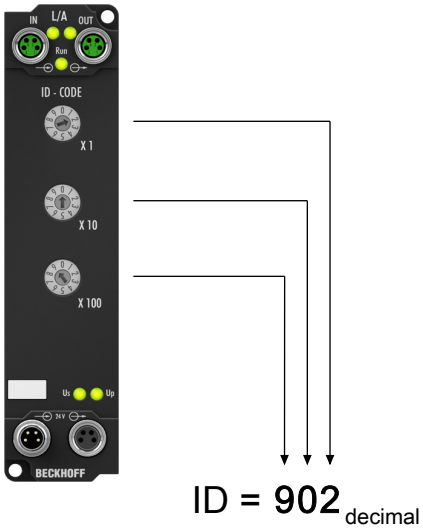



Fig. 71: ID switches sample

# 5.3 Adapt process image (EP1839-0042 only)

You can set which process data objects are transferred in the process image of an EtherCAT device. Possible reasons to do this:

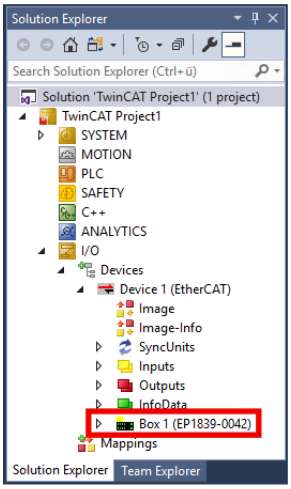
- Activate additional process data objects to control sub-functions that are not activated in the factory setting.
- Remove unused process data objects from the process image.

Recommendation: use the "Predefined PDO Assignments" for this purpose. "Predefined PDO Assignments" are useful predefined assemblies of process data objects.

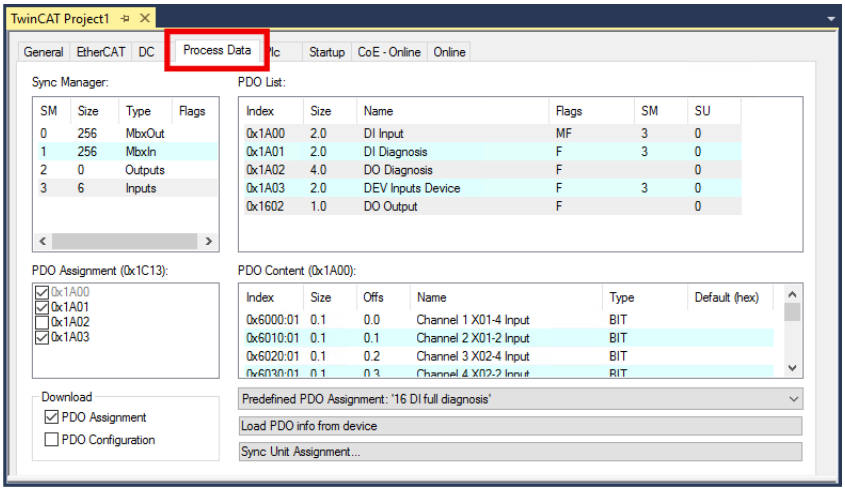
An overview of the Predefined PDO Assignments and process data objects can be found in chapter EP1839-0042 - Process image [▶ 58].

### Setting a Predefined PDO Assignment

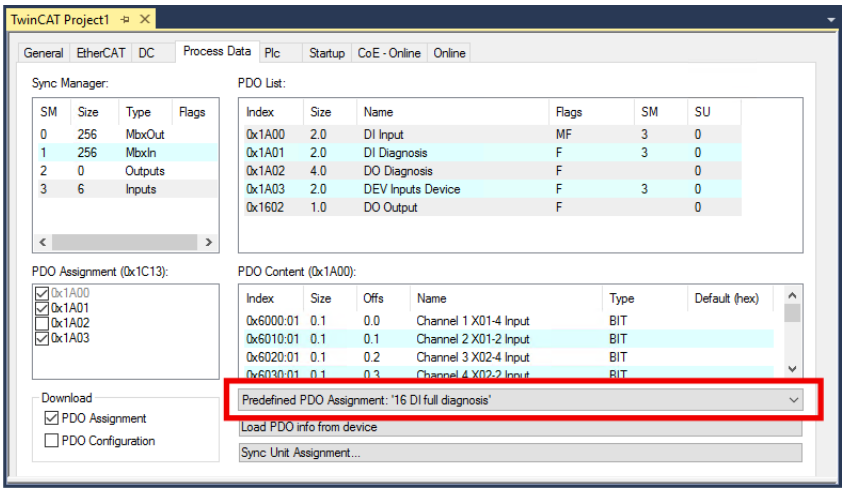
1. Double-click in the Solution Explorer on the EtherCAT device whose process image you want to change.




2. Click the "Process Data" tab.

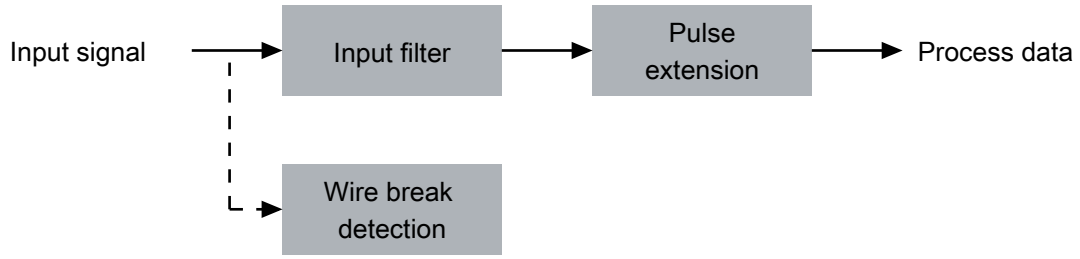


3. Select the desired entry in the drop-down menu "Predefined PDO Assignment".



## 5.4 Configure inputs (EP1839-0042 only)

The input signal of an input is digitally preprocessed. The following figure shows the signal flow of a digital input:



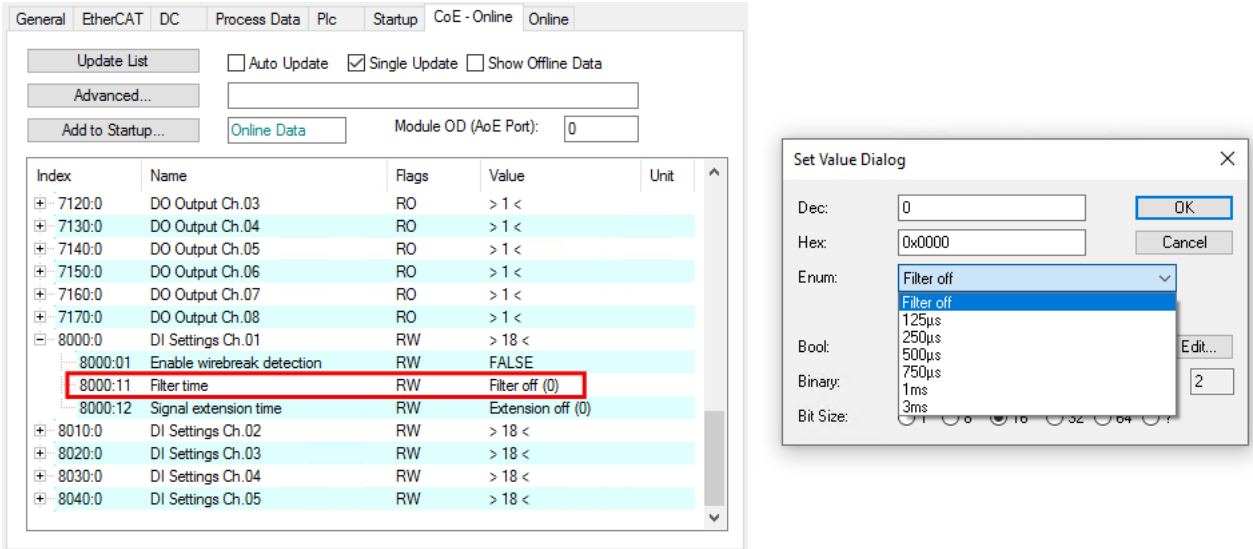

You can configure the sub-functions:

- Input filter [▶ 107]
- Pulse extension [▶ 109]
- Wire break detection [▶ 111]

### 5.4.1 Input filter

The input filter is a digital filter. Pulses shorter than the filter time are filtered out. The input signal is passed on delayed by the filter time. See Examples [▶ 108].

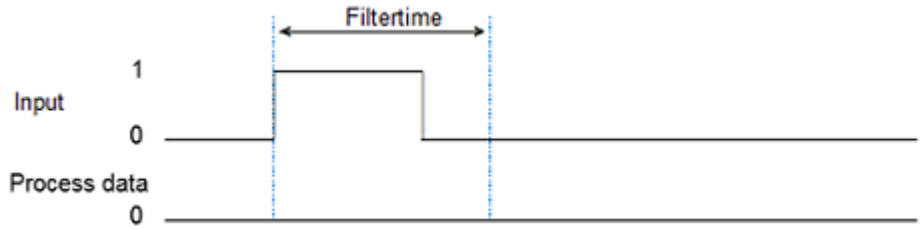
You can set the filter time for each input individually in the CoE parameters 80x00:11$_{hex}$ "Filter time".




The assignment of the CoE parameters to the connection designations can be found in the chapter Assignment of the connections [▶ 112].

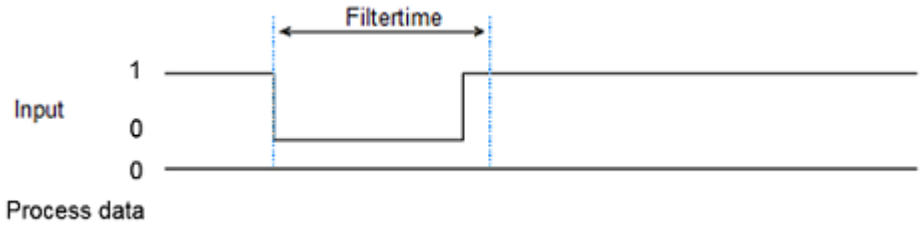
**Example 1**

A positive pulse shorter than the filter time is filtered out.



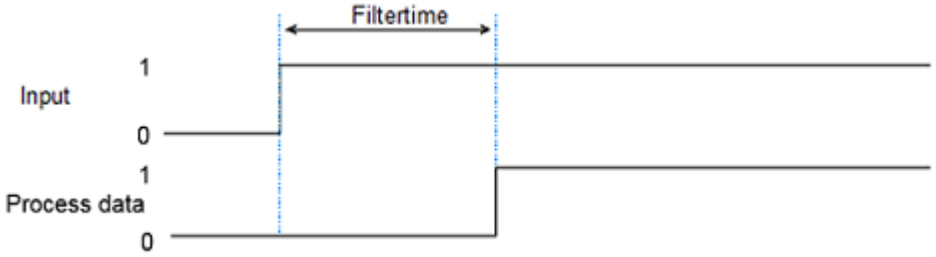

**Example 2**

A negative pulse shorter than the filter time is filtered out.



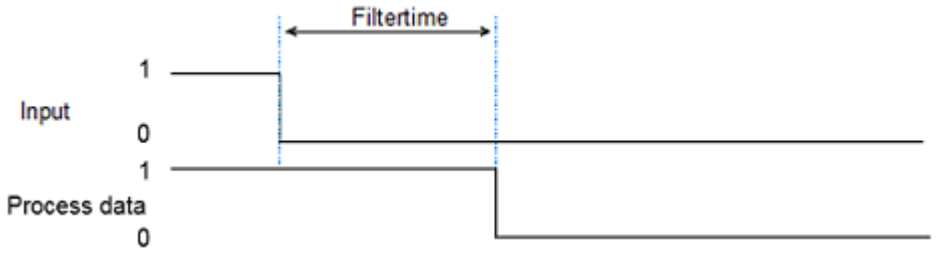

**Example 3**

A positive signal edge is delayed by the filter time.




**Example 4**

A negative signal edge is delayed by the filter time.

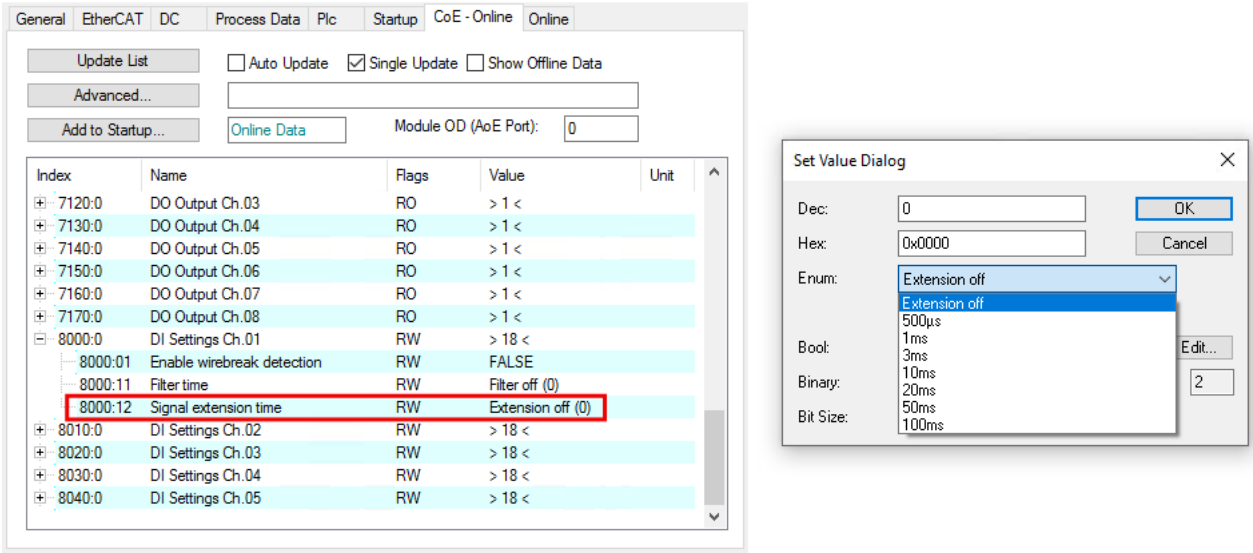


## 5.4.2 Pulse extension

The pulse extension extends short pulses to a minimum length. Pulses that occur while a previous pulse is being extended are ignored. Pulses can be positive or negative, i.e. jumps from 0 to 1 or from 1 to 0.

Pulse extension is located downstream of the input filter in the signal flow. Pulses shorter than the input filter time are therefore filtered out before they reach the pulse extension.

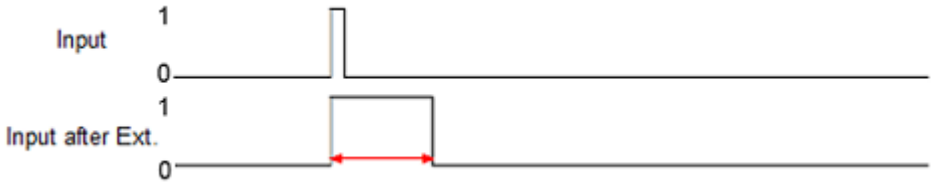
You can set the pulse extension time for each input individually in the CoE parameters 80x00:12$_{hex}$ "Signal extension time".




The assignment of the CoE parameters to the connection designations can be found in the chapter Assignment of the connections [▶ 112].

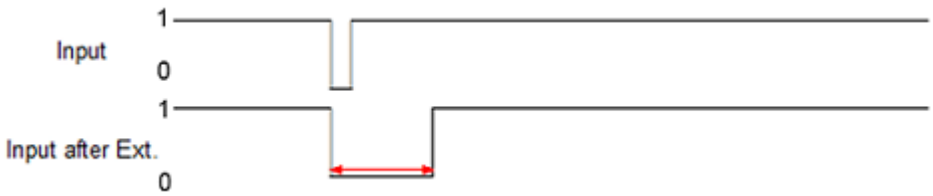
### Example 1

A short positive pulse is extended to the pulse extension time.



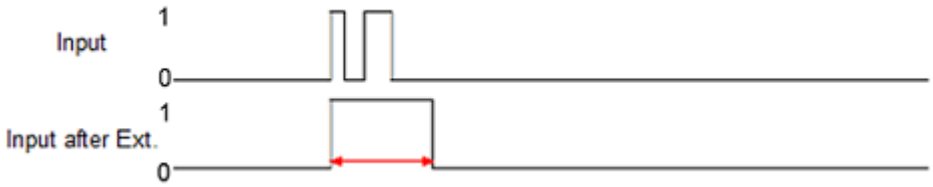

### Example 2

A short negative pulse is extended to the pulse extension time.



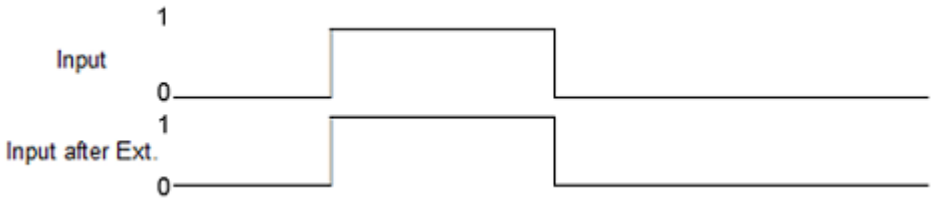

### Example 3

A short pulse is extended to the pulse extension time. The second pulse is within the pulse extension time and is ignored.



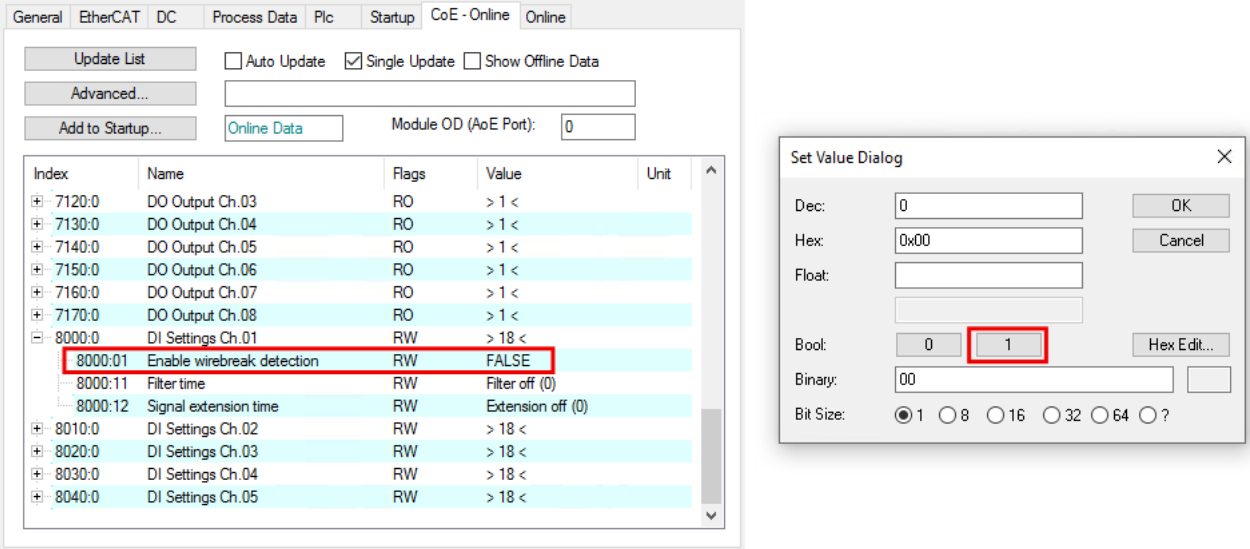

**Example 4**

A pulse that is longer than the pulse extension time is passed on unchanged.



## 5.4.3 Wire break detection

The wire break detection is deactivated in the factory setting. You can activate it for each channel individually with the CoE parameters 80x00:01$_{hex}$ "Enable wire break detection".




The assignment of the CoE parameters to the connection designations can be found in the chapter Assignment of the connections [▶ 112].

### Wire break message

When wire break detection is enabled, a wire break is reported in two ways:

- In the process data object DI Diagnosis [▶ 60] the corresponding bit is set to TRUE.
- The status LED of the affected channel lights up red. See chapter EP1839-00x2 [▶ 89].

### Functioning

The wire break detection monitors the input current of the respective digital input. If the input current falls below the threshold value of approx. 47 µA, this is interpreted as a wire break.

The box can detect a wire break even in the "off" state because the threshold value is so low that it is exceeded by the leakage current of usual sensors.

### Troubleshooting

Ideally, a wire break is only reported if there is actually a wire break in the sensor cable. However, there are other reasons for reporting wire break:

- The sensor cable is short-circuited to GND.
- No sensor is connected.
- The sensor is a mechanical switch.
  See section "Mechanical switches".

### Mechanical switches

A mechanical switch has no significant leakage current when it is open. If you use a mechanical switch as a sensor, a wire break is reported when the switch is open.

You have two options to solve this problem:

- Deactivate the wire break detection for the affected channel.
- Connect a resistance in parallel with the mechanical switch.
  The resistance must be dimensioned so that the current through the resistance exceeds the wire break detection threshold.

### 5.4.4 Assignment of the connections

The following table shows the assignment of the digital inputs to the CoE objects with which they are configured.

| Connection | Channel No. | CoE object for configuration |
|---|---|---|
| X01, pin 4 | 1 | $8000_{hex}$ |
| X01, pin 2 | 2 | $8010_{hex}$ |
| X02, pin 4 | 3 | $8020_{hex}$ |
| X02, pin 2 | 4 | $8030_{hex}$ |
| X03, pin 4 | 5 | $8040_{hex}$ |
| X03, pin 2 | 6 | $8050_{hex}$ |
| X04, pin 4 | 7 | $8060_{hex}$ |
| X04, pin 2 | 8 | $8070_{hex}$ |
| X05, pin 4 | 9 | $8080_{hex}$ |
| X05, pin 2 | 10 | $8090_{hex}$ |
| X06, pin 4 | 11 | $80A0_{hex}$ |
| X06, pin 2 | 12 | $80B0_{hex}$ |
| X07, pin 4 | 13 | $80C0_{hex}$ |
| X07, pin 2 | 14 | $80D0_{hex}$ |
| X08, pin 4 | 15 | $80E0_{hex}$ |
| X08, pin 2 | 16 | $80F0_{hex}$ |

## 5.5 Configure sensor supply (EP1839-0042 only)

In the factory setting, the sensor supply outputs behave like ordinary supply voltage outputs. They are switched on by default and forward the supply voltage $U_S$ to connected sensors.

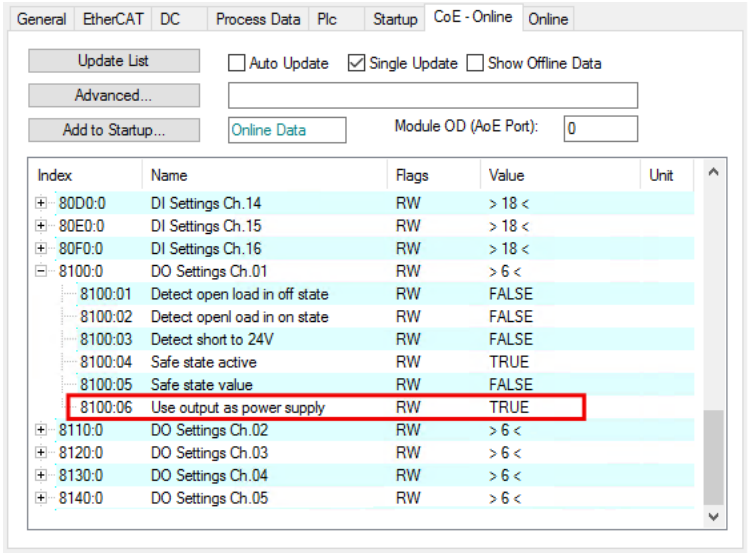
### 5.5.1 Switching outputs

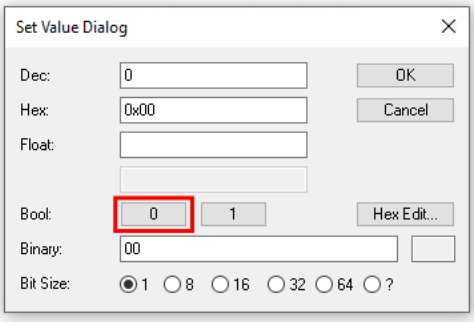
You can switch the sensor supply outputs like digital outputs.

#### Preparation

To be able to switch an output, set the corresponding CoE parameter 81x00:06 "Use output as power supply" to FALSE.

| Connection | CoE parameters |
|---|---|
| X01 | 8100:06 |
| X02 | 8110:06 |
| X03 | 8120:06 |
| X04 | 8130:06 |
| X05 | 8140:06 |
| X06 | 8150:06 |
| X07 | 8160:06 |
| X08 | 8170:06 |




#### Process data

The variables for switching the outputs are located in the process data object DO Output [▶ 63].

This process data object is disabled in the factory settings. You can enable it by setting the Predefined PDO Assignment "16 DI full diagnosis 8 DO sensor supply". The procedure for setting a Predefined PDO Assignment can be found in chapter Adapt process image (EP1839-0042 only) [▶ 105].

### 5.5.1.1 Behavior on EtherCAT failure

You can define which switching state an output is to assume in the event of an EtherCAT failure. However, this only affects outputs that you have configured for switching, see chapter Switching outputs [▶ 113].

#### Functioning

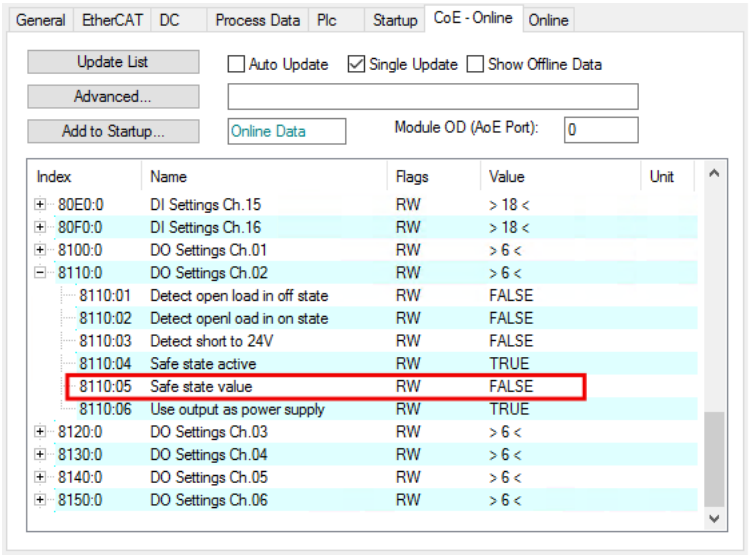
If the EtherCAT state is not OP , the box switches all digital outputs to the switching state "Safe state value". This does not only happen in case of an EtherCAT failure, but also in the following cases, for example:

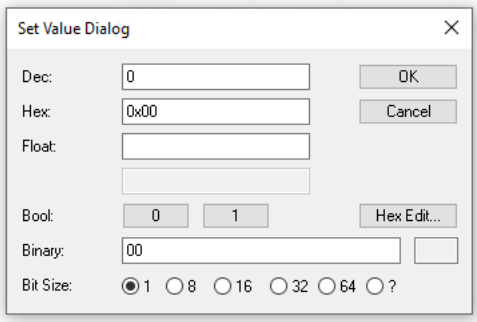
- EtherCAT start-up phase, e.g. shortly after switching on the supply voltage
- Manual change of the EtherCAT status by the EtherCAT master

#### Configure

In the factory setting the "Safe state value" of all outputs is the value FALSE. The outputs are therefore switched off if the EtherCAT communication fails.

You can set the value for each output individually in the CoE parameters 80*n*00:05$_{hex}$ "Safe state value".

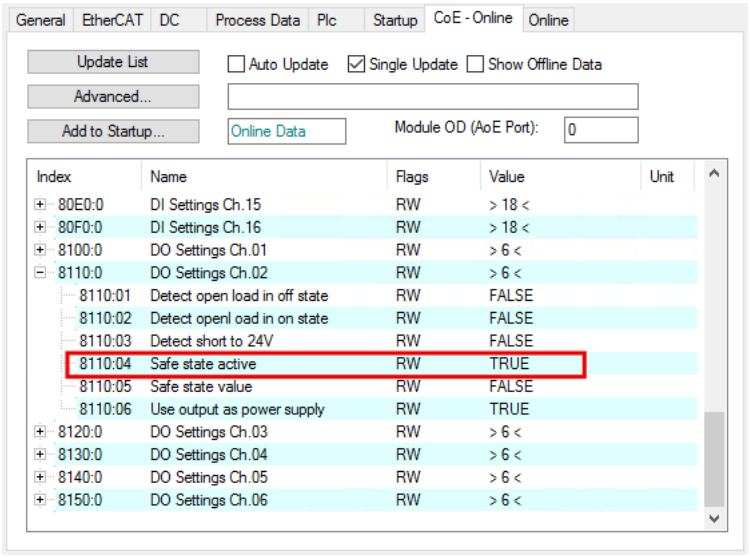


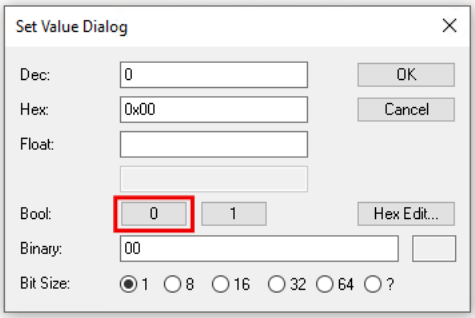




#### Deactivate

If you deactivate the function "Safe state", the respective channel retains the switching state it had before the communication failure after an EtherCAT failure

In the factory setting, the function "Safe state" is activated for all outputs. You can deactivate them individually for each output. To do this, set the CoE parameter 80*n*00:04$_{hex}$ "Safe state active" to FALSE.


General
EtherCAT
DC
Process Data
Plc
Startup
CoE - Online
Online
Update List
Auto Update
Single Update
Show Offline Data
Advanced...
Add to Startup...
Online Data
Module OD (AoE Port):
0
Index
Name
Flags
Value
Unit
80E0:0 DI Settings Ch.15 RW > 18 <
80F0:0 DI Settings Ch.16 RW > 18 <
8100:0 DO Settings Ch.01 RW > 6 <
8110:0 DO Settings Ch.02 RW > 6 <
8110:01 Detect open load in off state RW FALSE
8110:02 Detect openl oad in on state RW FALSE
8110:03 Detect short to 24V RW FALSE
8110:04 Safe state active RW TRUE
8110:05 Safe state value RW FALSE
8110:06 Use output as power supply RW TRUE
8120:0 DO Settings Ch.03 RW > 6 <
8130:0 DO Settings Ch.04 RW > 6 <
8140:0 DO Settings Ch.05 RW > 6 <
8150:0 DO Settings Ch.06 RW > 6 <

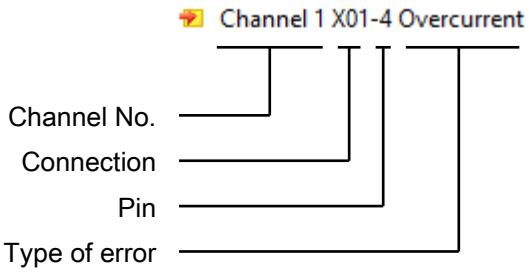

Set Value Dialog
Dec:
0
OK
Hex:
0x00
Cancel
Float:
Bool:
0
1
Hex Edit...
Binary:
00
Bit Size:
1
8
16
32
64
?

## 5.5.2 Diagnostics

Each output can detect and report different types of faults. Errors are reported in two ways:

- The status LED of the output lights up red.
- A status bit in the process data object DO Diagnosis [▶ 62] is set.

The names of the status bits are structured as follows:




The different types of errors are described below:

**"Overcurrent"**

Meaning: The current output current is significantly higher than the nominal output current. Current limitation is active and limits the output current to the short circuit current.

When limiting the output current, the electronics heat up. If this condition persists, the output becomes too hot. In this case the output is switched off to protect it from destruction. The error "Overload" is reported, see below.

**"Overload"**

Meaning: The output has been switched off due to overtemperature. It is automatically switched on again when the electronics have cooled down again.

**"Open Load"**

Meaning: wire break. The present output current is so low that there is probably no load connected or a wire break.

In the factory setting, the wire break detection is deactivated. This prevents an unused output from being interpreted as a wire break.

You can enable wire break detection for each channel individually in the CoE parameters 81x00:01$_{hex}$ "Detect open wire in off state" and 81x00:02$_{hex}$ "Detect open wire in on state".

In some cases it may be useful not to activate the wire break detection so that no wire breakage is detected during normal operation. E.g.:

- Very high-resistance loads
- Unused outputs

**"Short to 24 V"**

Meaning: A Hi level was detected at the output, although the output is switched off. A possible cause is a short circuit of the output to one of the supply voltages.

In the factory setting, the 24 V short-circuit detection is deactivated. You can activate it for each channel individually in the CoE parameters 81x00:03$_{hex}$ "Detect short circuit to 24V".

## 5.6 Acceleration measurement (EP1816-3008)

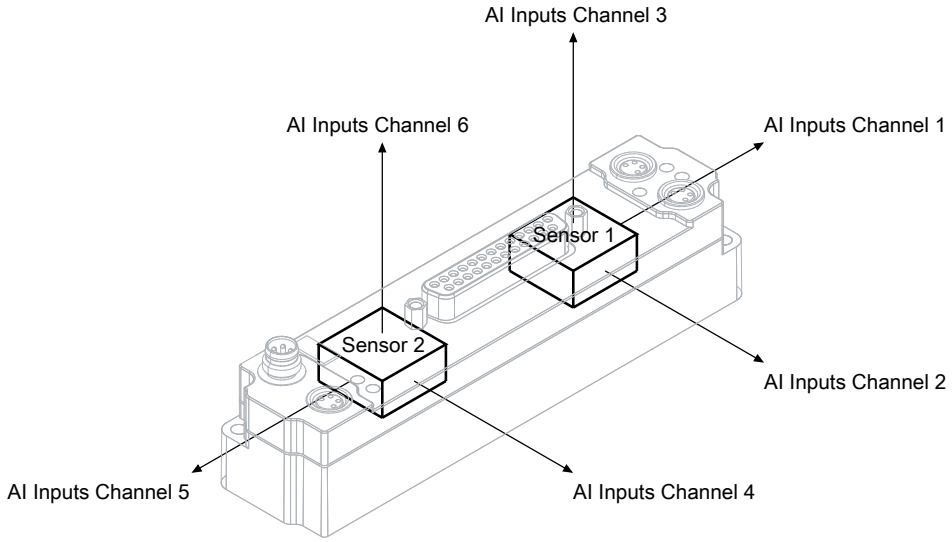
EP1816-3008 has two accelerometers. Each accelerometer measures the acceleration in all three spatial directions.

The accelerometers are offset by 90°. This enables a plausibility check of the measured values.

By converting the measured acceleration values, it is also possible to measure the inclination. See chapter: Inclination measurement [▶ 121]

### 5.6.1 Acceleration axes

The following diagram shows the directions of the acceleration axes:




"AI Inputs Channel 1" to "AI Inputs Channel 6" are the process data objects that contain the measured values.
See chapter: "Process Image", section "AI Inputs Channel 1 to 6" [▶ 53].

## 5.6.2 Configuration

This chapter describes the parameters for acceleration measurement.

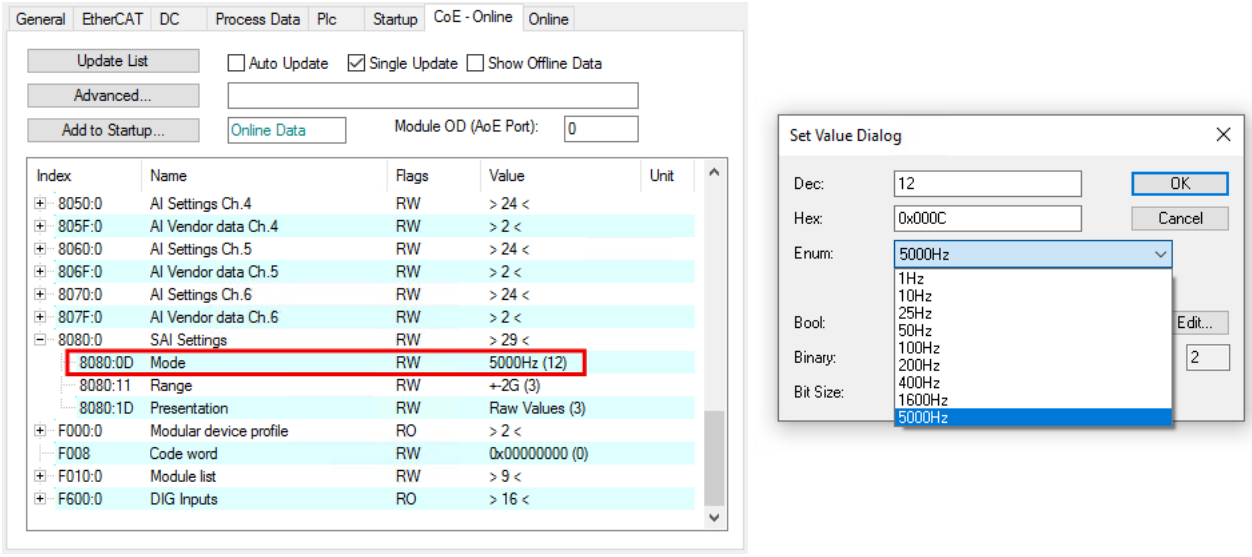
You can find the parameters in CoE object $8080_{hex}$ "SAI settings".

### 5.6.2.1 Sampling rate

In the factory setting the sampling rate is set to 5 kHz. 5 kHz is the highest possible sampling rate.

You can change the sampling rate in parameter $8080:0D_{hex}$ "Mode".

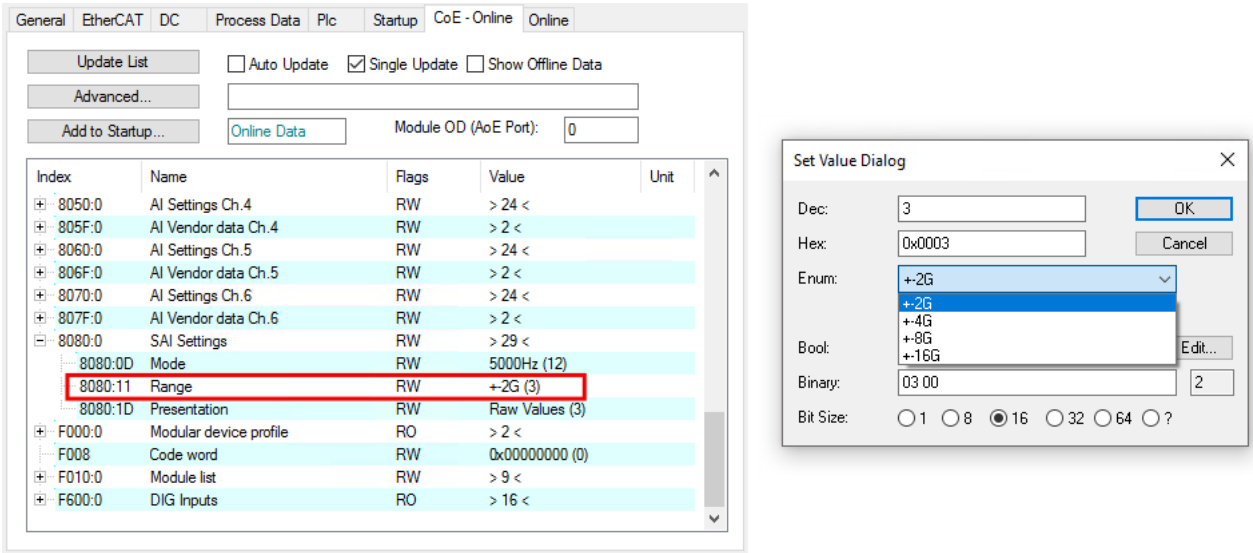
Recommendation: Leave the sampling rate at 5 kHz. A lower sampling rate has no advantages.




### 5.6.2.2 Measuring range

In the factory setting the measuring range is ±2 g.

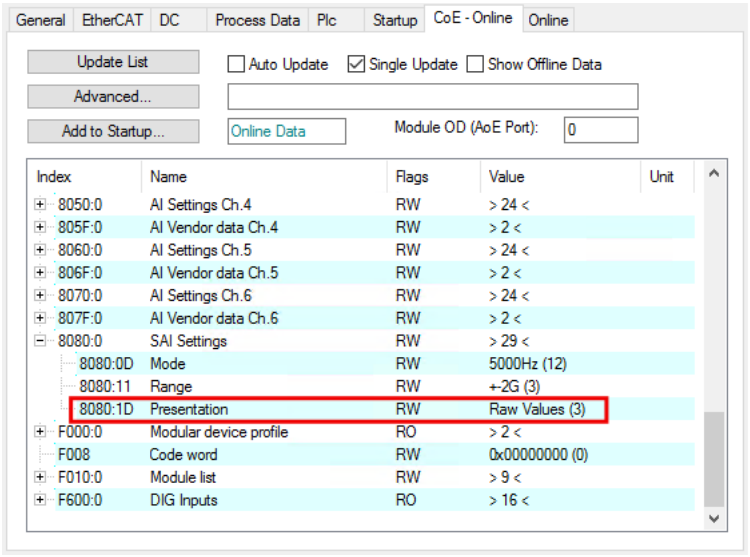
You can change the measuring range in parameter $8080:11_{hex}$ "Range".

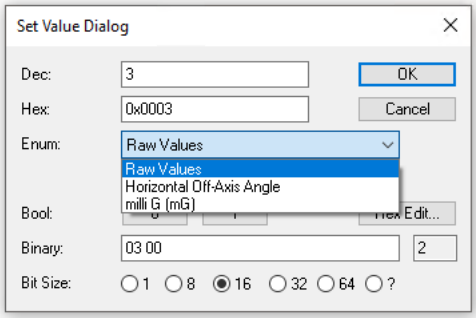


### 5.6.2.3 Display of the measured values

In the factory setting the measured values are displayed as raw values.

You can change the display in parameter 8080:1D$_{hex}$ "Presentation".




Select one of the following display types:

- "Raw Values": display as raw values
- "milli G": display as physical values with the unit mg.

The option "Horizontal Off-Axis Angle" does not apply for the display of the measured acceleration values. "Horizontal Off-Axis Angle" activates the inclination measurement [▶ 121].

Evaluate the measured values according to the selected display type. See chapter: Interpretation of the measured values [▶ 120]

The raw values have a higher resolution than the physical values.

## 5.6.3 Interpretation of the measured values

The measured acceleration values can be displayed in two different ways. See chapter Display of the measured values [▶ 119].

The interpretation of the measured values depends on the display type.

### Interpretation of the raw values

The raw values are arranged in the most significant 10 bits of the variable "Value", which is 16 bits long:

| Bit: | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contents: | Raw value | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 |

Recommendation: in the PLC program use the function `SHR()` to shift a raw value to the least significant 10 bits: `SHR(<measured value>,6)`. After shifting the raw value is easier to process.

The raw values can range between -510 and +510:

- -510 is the lowest value of the measuring range.
  In the +/-2 g measuring range, the lowest value is -2 g.
- +510 corresponds to the full scale value.
  In the +/-2 g measuring range, the full scale value is +2 g.

Between -510 and +510 the raw values are linear. Use the following formula to convert a raw value to a physical quantity:

$$a = MBE \times \frac{n}{510}$$

*a*: Acceleration. Unit: g.
1 g = 9.81 m/s²

MBE: full scale value

*n*: raw value

### Interpretation of the physical values

The physical values have the unit mg.
1 mg = 0.001 x 9.81 m/s²

# 5.7 Inclination measurement (EP1816-3008)

The inclination measurement determines the inclination of the Box in relation to the gravity. The angles of inclination are calculated from the measured acceleration values [▶ 117].

EP1816-3008 can calculate two angles of inclination with a resolution of 1°.
See chapter Calculation in the Box [▶ 121].

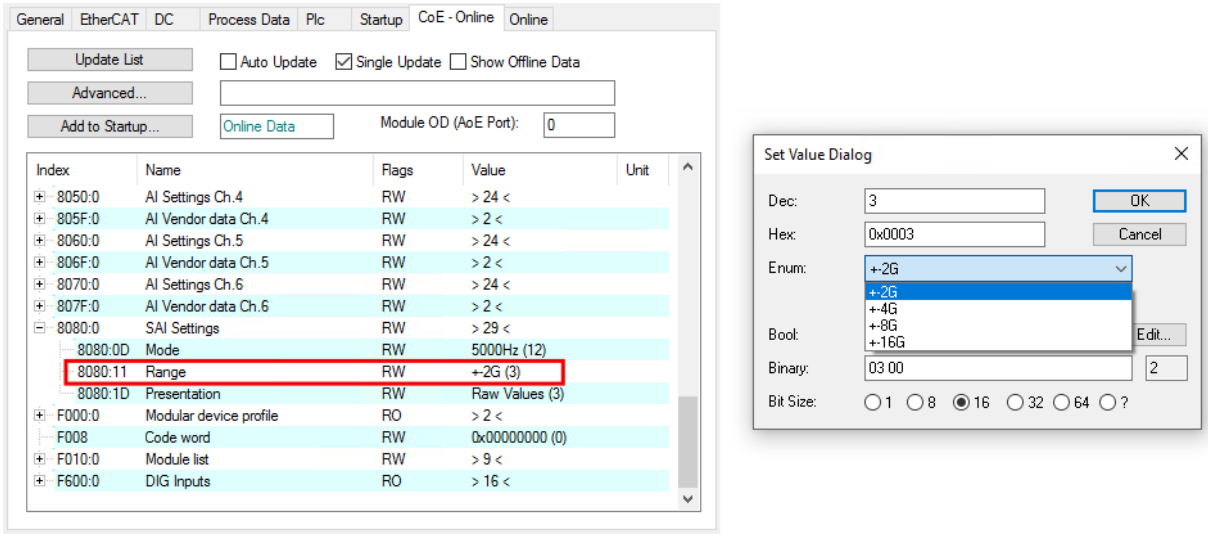
If a higher resolution is required, the calculation has to be implemented in the PLC program on the controller.
Reason: calculation of the angles of inclination with higher resolutions is very computationally intensive.
See chapter Calculation in the controller [▶ 123]

## 5.7.1 Calculation in the Box

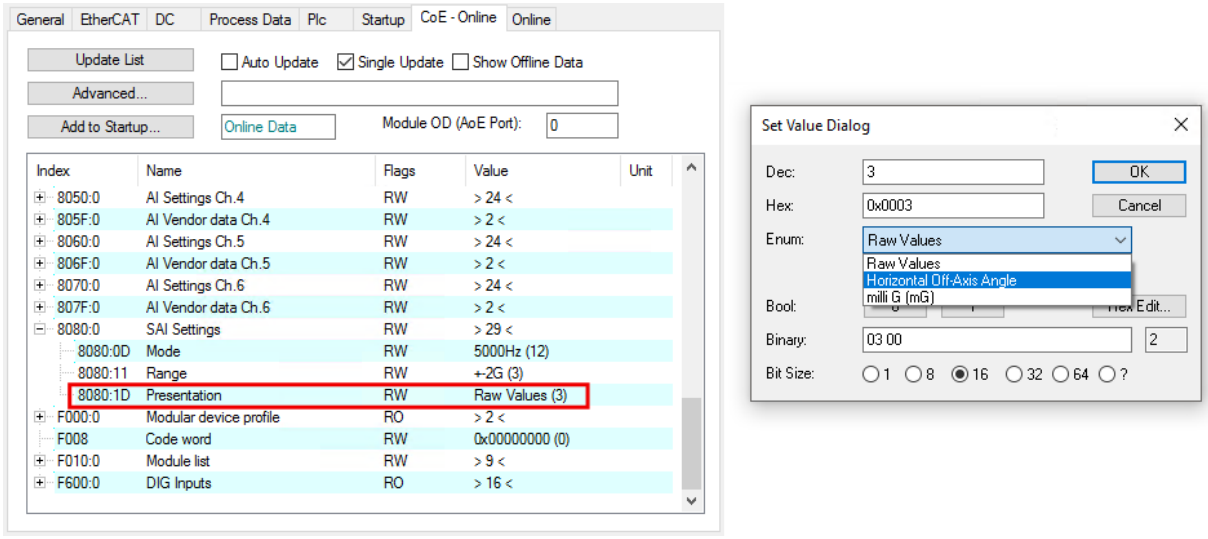
This chapter describes how to configure EP1816-3008 to calculate angles of inclination internally.

### Configuration

1. Set the parameter 8080:11$_{hex}$ "Range" to any value except "+-16G".
   Recommended: "+-2G" (factory setting)



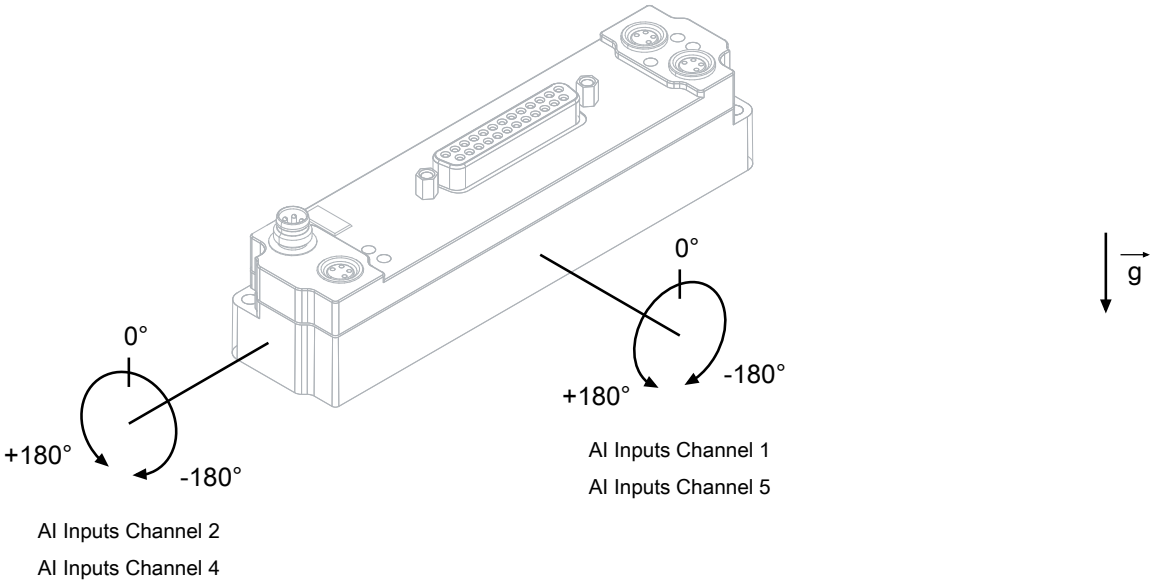

2. Set the parameter 8080:1D$_{hex}$ "Presentation" to the value "Horizontal Off-Axis Angle".




⇨ Internal calculation of the angles of inclination is activated.

### Evaluation

Evaluate the variables in the process image according to the following diagram:



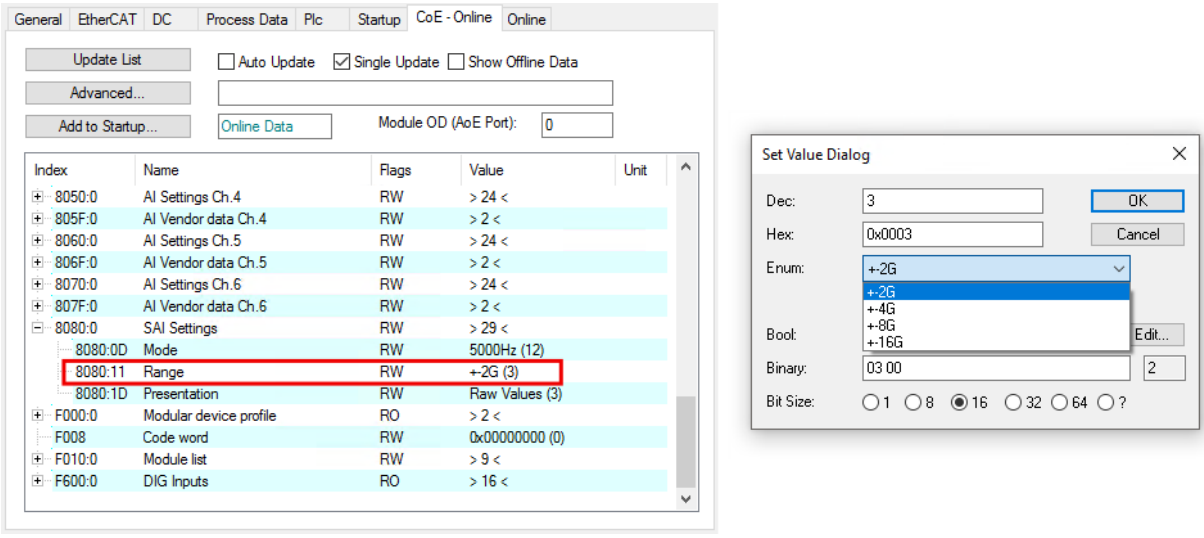

"AI Inputs Channel 1" to "AI Inputs Channel 5" are the process data objects that contain the calculated angles of inclination.
See chapter: "Process Image", section "AI Inputs Channel 1 to 6" [▶ 53].

The angles of inclination are output in the unit "1 degree per LSB".

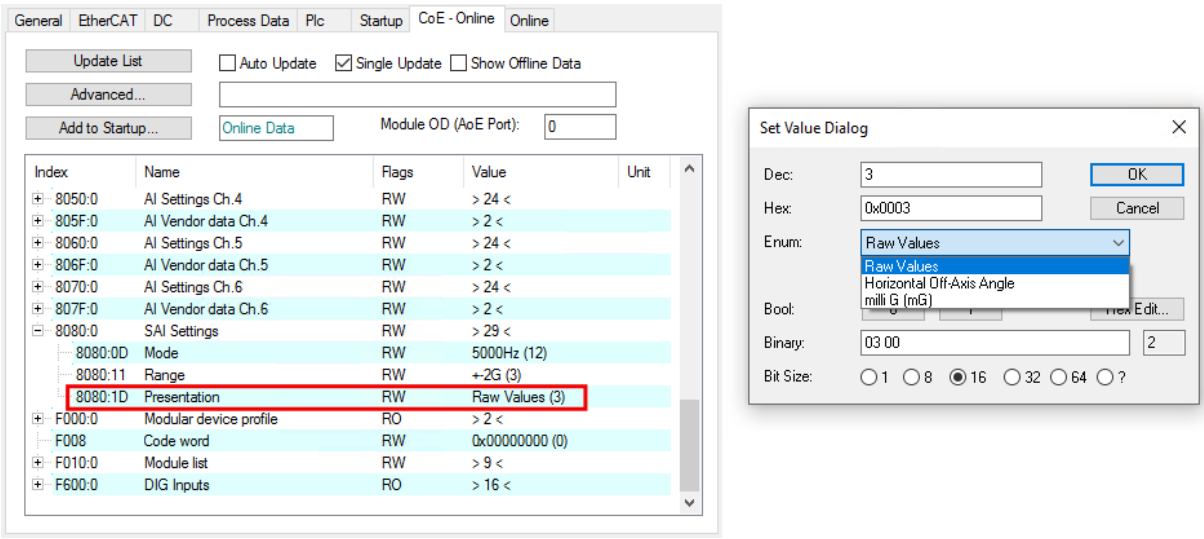
## 5.7.2 Calculation in the controller

### Configuration

1. Set the parameter 8080:11$_{hex}$ "Range" to the value "+-2G".
   Explanation: this is the measuring range with the highest resolution.




2. Set the parameter 8080:1D$_{hex}$ to the value "Raw Values".




### Evaluation

You can calculate the angles of inclination using the following formulas:

$$\theta = \tan^{-1}\left(\frac{a_X}{\sqrt{a_Y{}^2 + a_Z{}^2}}\right) \times \frac{360°}{2\pi}$$

$\theta$: angle of inclination around the y-axis
$a_x$, $a_y$, $a_z$: measured acceleration values
$\tan^{-1}$: arc tangent

$$\Psi = \tan^{-1}\left(\frac{a_Y}{\sqrt{a_X{}^2 + a_Z{}^2}}\right) \times \frac{360°}{2\pi}$$

$\Psi$: angle of inclination around the x-axis
$a_x$, $a_y$, $a_z$: measured acceleration values
$\tan^{-1}$: arc tangent

The chapter "Example" [▶ 125] shows an example for the implementation of these formulas in TwinCAT.

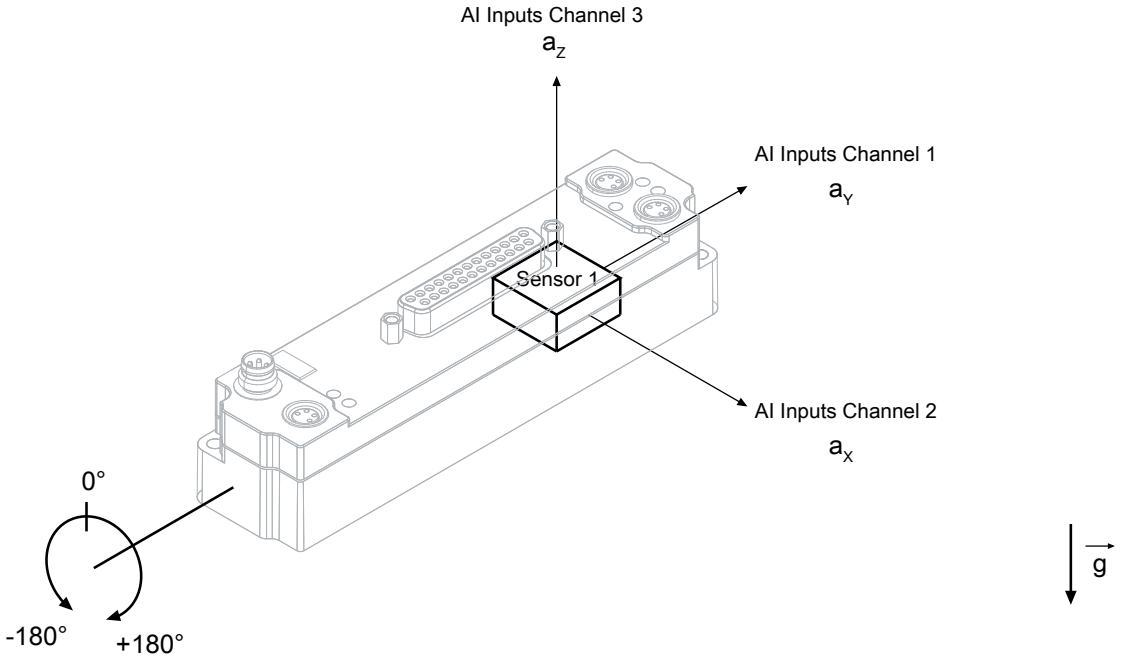
- In the program code, make sure that the denominator never becomes zero.

- Use a software filter for smoothing the calculated angles of inclination. See chapter: Smoothing of measured values [▶ 126].

### 5.7.2.1 Example

This chapter shows an example for calculating an angle of inclination in a PLC program.

Requirement: the inclination measurement was configured as described in chapter Calculation in the controller [▶ 123].




**Variable links in TwinCAT**

- "AI Inputs Channel 1" > "Value" is linked to `ay`
- "AI Inputs Channel 2" > "Value" is linked to `ax`
- "AI Inputs Channel 3" > "Value" is linked to `az`

**Program code**

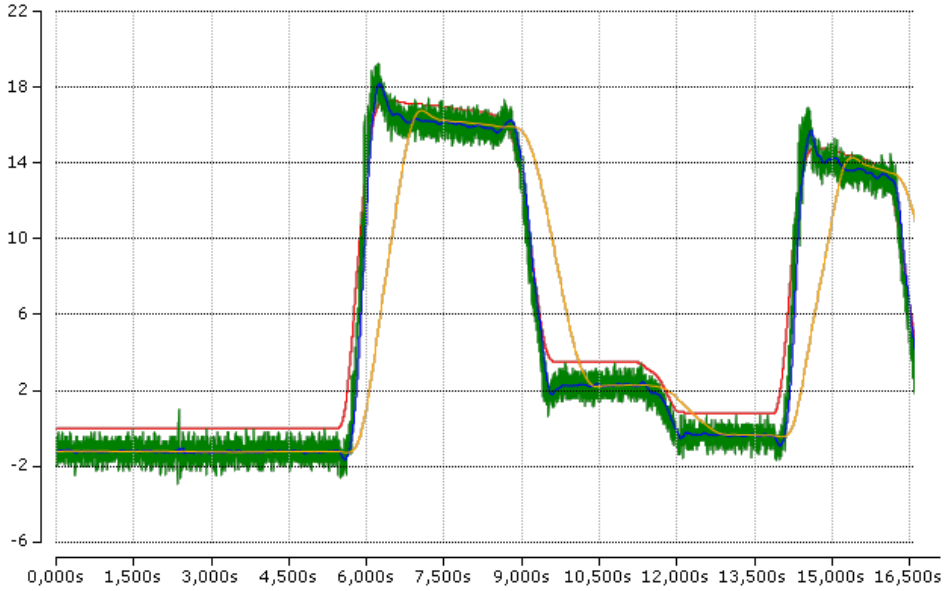
```
PROGRAM MAIN
VAR
  ax AT %I*      : INT;
  ay AT %I*      : INT;
  az AT %I*      : INT;
  Inclincation   : LREAL;
END_VAR


IF (ay <> 0 OR az <> 0) THEN         (* Prevent division by 0 *)
  Inclincation := ATAN( ax / SQRT( ay * ay + az * az ) ) * 360 / ( 2 * 3.14 );
END_IF

(* Compensate zero crossing of az *)
IF az > 0 THEN
  Inclincation := 180 - Inclincation;
END_IF

(* Insert offset to shift the measuring range from -90...270 to -180...+180 *)
IF Inclincation > 180 THEN
  Inclincation := Inclincation - 360;
END_IF
```

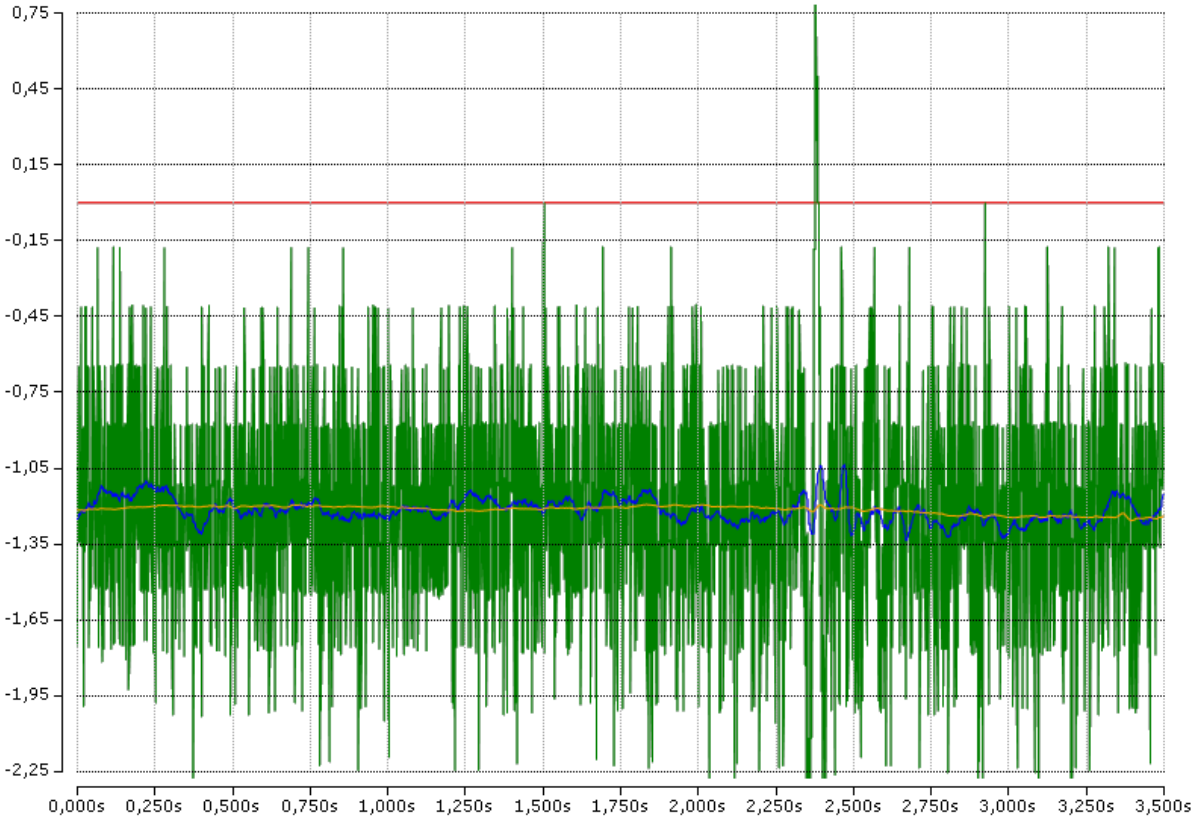
## 5.7.3 Smoothing of measured values

The measured inclination angles are subject to significant noise.

Use software filters for smoothing the measured values. In the simplest case, use a sliding average filter.

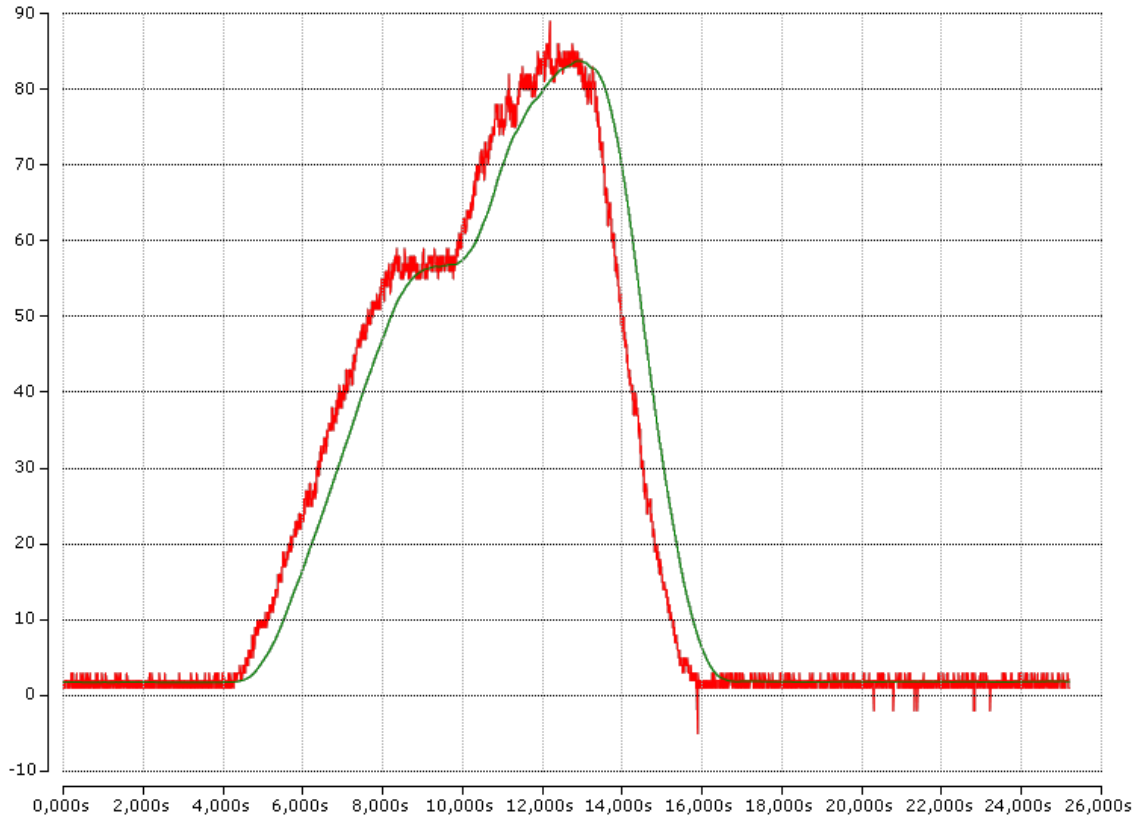
**Example 1**




| Line color | Meaning |
|---|---|
| red | Reference angle of inclination measured with an incremental encoder. |
| green | Measured angle of inclination, unfiltered. |
| blue | Measured angle of inclination filtered with a fast filter. |
| yellow | Measured angle of inclination filtered with a sliding average value over 1000 values. |

**Example 2**




Red: measured angle of inclination, unfiltered.

Green: measured angle of inclination filtered with a sliding average value.

## 5.8 Restoring the delivery state

To restore the delivery state for backup objects in ELxxxx terminals / EPxxxx- and EPPxxxx boxes, the CoE object *Restore default parameters, SubIndex 001* can be selected in the TwinCAT System Manager (Config mode).

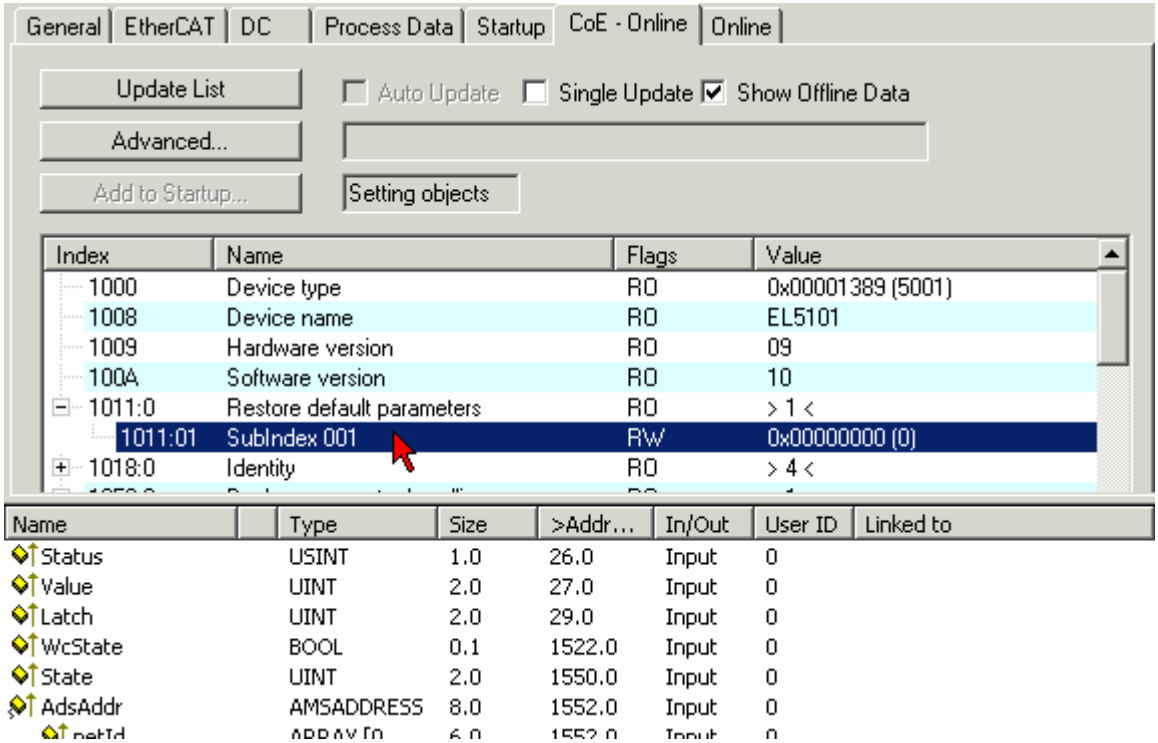



Fig. 72: Selecting the Restore default parameters PDO

Double-click on *SubIndex 001* to enter the Set Value dialog. Enter the value **1684107116** in field *Dec* or the value **0x64616F6C** in field *Hex* and confirm with OK.

All backup objects are reset to the delivery state.

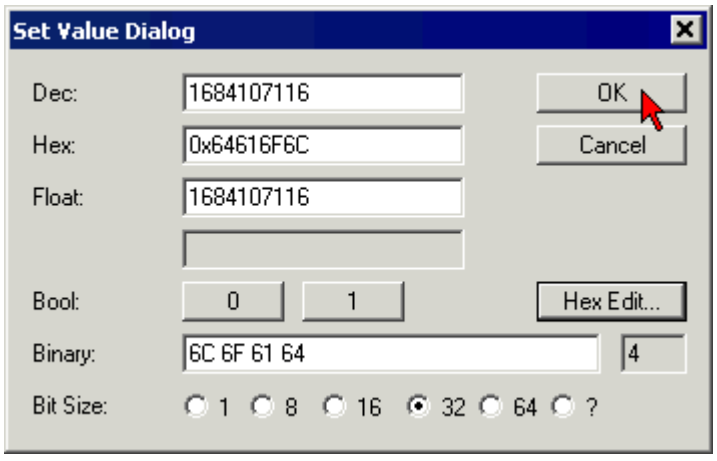



Fig. 73: Entering a restore value in the Set Value dialog

**Alternative restore value**

In some older terminals / boxes the backup objects can be switched with an alternative restore value:
Decimal value: 1819238756
Hexadecimal value: 0x6C6F6164

An incorrect entry for the restore value has no effect.

## 5.9 Decommissioning

**⚠ WARNING**

**Risk of electric shock!**

Bring the bus system into a safe, de-energized state before starting disassembly of the devices!

**Disposal**

In order to dispose of the device, it must be removed.

In accordance with the WEEE Directive 2012/19/EU, Beckhoff takes back old devices and accessories in Germany for proper disposal. Transport costs will be borne by the sender.

Return the old devices with the note "for disposal" to:

Beckhoff Automation GmbH & Co. KG
Service Department
Stahlstraße 31
D-33415 Verl

# 6 CoE parameters

## 6.1 EP1816-0008 - Object Overview

**EtherCAT XML Device Description**

The description corresponds to the display of the CoE objects from the EtherCAT XML Device Description. It is strongly recommended to download the latest revision of the corresponding XML file from the Beckhoff website (http://www.beckhoff.com/english/default.htm?download/elconfg.htm) and follow the installation instructions.

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| 1000 [▶ 133] | | Device type | RO | 0x01181389 (18355081$_{dec}$) |
| 1008 [▶ 133] | | Device name | RO | EP1816-0008 |
| 1009 [▶ 134] | | Hardware version | RO | 00 |
| 100A [▶ 134] | | Software version | RO | 01 |
| 1011 [▶ 133]:0 | **SubIndex** | Restore default parameters | RO | 0x01 (1$_{dec}$) |
| | 1011:01 | SubIndex 001 | RW | 0x00000000 (0$_{dec}$) |
| 1018 [▶ 134]:0 | **SubIndex** | Identity | RO | 0x04 (4$_{dec}$) |
| | 1018:01 | Vendor ID | RO | 0x00000002 (2$_{dec}$) |
| | 1018:02 | Product code | RO | 0x07184052 (119029842$_{dec}$) |
| | 1018:03 | Revision | RO | 0x00100008 (1048584$_{dec}$) |
| | 1018:04 | Serial number | RO | 0x00000000 (0$_{dec}$) |
| 10F0 [▶ 134]:0 | **SubIndex** | Backup parameter handling | RO | 0x01 (1$_{dec}$) |
| | 10F0:01 | Checksum | RO | 0x00000000 (0$_{dec}$) |
| 1A00 [▶ 134]:0 | **SubIndex** | DO TxPDO-Map Inputs Ch.1 | RO | 0x0B (11$_{dec}$) |
| | 1A00:01 | SubIndex 001 | RO | 0x6000:01, 1 |
| | 1A00:02 | SubIndex 002 | RO | 0x6000:02, 1 |
| | 1A00:03 | SubIndex 003 | RO | 0x6000:03, 1 |
| | 1A00:04 | SubIndex 004 | RO | 0x6000:04, 1 |
| | 1A00:05 | SubIndex 005 | RO | 0x6000:05, 1 |
| | 1A00:06 | SubIndex 006 | RO | 0x6000:06, 1 |
| | 1A00:07 | SubIndex 007 | RO | 0x6000:07, 1 |
| | 1A00:08 | SubIndex 008 | RO | 0x6000:08, 1 |
| | 1A00:09 | SubIndex 009 | RO | 0x0000:00, 5 |
| | 1A00:0A | SubIndex 010 | RO | 0x1C32:20, 1 |
| | 1A00:0B | SubIndex 011 | RO | 0x0000:00, 2 |
| 1A01 [▶ 135]:0 | **SubIndex** | DO TxPDO-Map Inputs Ch.2 | RO | 0x0B (11$_{dec}$) |
| | 1A01:01 | SubIndex 001 | RO | 0x6010:01, 1 |
| | 1A01:02 | SubIndex 002 | RO | 0x6010:02, 1 |
| | 1A01:03 | SubIndex 003 | RO | 0x6010:03, 1 |
| | 1A01:04 | SubIndex 004 | RO | 0x6010:04, 1 |
| | 1A01:05 | SubIndex 005 | RO | 0x6010:05, 1 |
| | 1A01:06 | SubIndex 006 | RO | 0x6010:06, 1 |
| | 1A01:07 | SubIndex 007 | RO | 0x6010:07, 1 |
| | 1A01:08 | SubIndex 008 | RO | 0x6010:08, 1 |
| | 1A01:09 | SubIndex 009 | RO | 0x0000:00, 5 |
| | 1A01:0A | SubIndex 010 | RO | 0x1C32:20, 1 |
| | 1A01:0B | SubIndex 011 | RO | 0x0000:00, 2 |
| 1C00 [▶ 135]:0 | **SubIndex** | Sync manager type | RO | 0x04 (4$_{dec}$) |
| | 1C00:01 | SubIndex 001 | RO | 0x01 (1$_{dec}$) |
| | 1C00:02 | SubIndex 002 | RO | 0x02 (2$_{dec}$) |
| | 1C00:03 | SubIndex 003 | RO | 0x03 (3$_{dec}$) |
| | 1C00:04 | SubIndex 004 | RO | 0x04 (4$_{dec}$) |
| 1C12 [▶ 135]:0 | **SubIndex** | RxPDO assign | RO | 0x00 (0$_{dec}$) |
| 1C13 [▶ 135]:0 | **SubIndex** | TxPDO assign | RO | 0x02 (2$_{dec}$) |
| | 1C13:01 | SubIndex 001 | RO | 0x1A00 (6656$_{dec}$) |
| | 1C13:02 | SubIndex 002 | RO | 0x1A01 (6657$_{dec}$) |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| 1C33 [▶ 136]:0 | **SubIndex** | SM input parameter | RO | 0x20 ($32_{dec}$) |
| | 1C33:01 | Sync mode | RW | 0x0022 ($34_{dec}$) |
| | 1C33:02 | Cycle time | RW | 0x000186A0 ($100000_{dec}$) |
| | 1C33:03 | Shift time | RO | 0x00000000 ($0_{dec}$) |
| | 1C33:04 | Sync modes supported | RO | 0xC007 ($49159_{dec}$) |
| | 1C33:05 | Minimum cycle time | RO | 0x000124F8 ($75000_{dec}$) |
| | 1C33:06 | Calc and copy time | RO | 0x00000000 ($0_{dec}$) |
| | 1C33:08 | Command | RW | 0x0000 ($0_{dec}$) |
| | 1C33:09 | Delay time | RO | 0x00000000 ($0_{dec}$) |
| | 1C33:0B | SM event missed counter | RO | 0x0000 ($0_{dec}$) |
| | 1C33:0C | Cycle exceeded counter | RO | 0x0000 ($0_{dec}$) |
| | 1C33:0D | Shift too short counter | RO | 0x0000 ($0_{dec}$) |
| | 1C33:20 | Sync error | RO | 0x00 ($0_{dec}$) |
| 6000 [▶ 137]:0 | **SubIndex** | DO Inputs Ch.1 | RO | 0x0E ($14_{dec}$) |
| | 6000:01 | Input 1 | RO | 0x00 ($0_{dec}$) |
| | 6000:02 | Input 2 | RO | 0x00 ($0_{dec}$) |
| | 6000:03 | Input 3 | RO | 0x00 ($0_{dec}$) |
| | 6000:04 | Input 4 | RO | 0x00 ($0_{dec}$) |
| | 6000:05 | Input 5 | RO | 0x00 ($0_{dec}$) |
| | 6000:06 | Input 6 | RO | 0x00 ($0_{dec}$) |
| | 6000:07 | Input 7 | RO | 0x00 ($0_{dec}$) |
| | 6000:08 | Input 8 | RO | 0x00 ($0_{dec}$) |
| | 6000:0E | Sync Error | RO | 0x00 ($0_{dec}$) |
| 6010 [▶ 137]:0 | **SubIndex** | DO Inputs Ch.2 | RO | 0x0E ($14_{dec}$) |
| | 6010:01 | Input 1 | RO | 0x00 ($0_{dec}$) |
| | 6010:02 | Input 2 | RO | 0x00 ($0_{dec}$) |
| | 6010:03 | Input 3 | RO | 0x00 ($0_{dec}$) |
| | 6010:04 | Input 4 | RO | 0x00 ($0_{dec}$) |
| | 6010:05 | Input 5 | RO | 0x00 ($0_{dec}$) |
| | 6010:06 | Input 6 | RO | 0x00 ($0_{dec}$) |
| | 6010:07 | Input 7 | RO | 0x00 ($0_{dec}$) |
| | 6010:08 | Input 8 | RO | 0x00 ($0_{dec}$) |
| | 6010:0E | Sync Error | RO | 0x00 ($0_{dec}$) |
| F000 [▶ 137]:0 | **SubIndex** | Modular device profile | RO | 0x02 ($2_{dec}$) |
| | F000:01 | Module index distance | RO | 0x0010 ($16_{dec}$) |
| | F000:02 | Maximum number of modules | RO | 0x0002 ($2_{dec}$) |
| F008 [▶ 137] | | Code word | RW | 0x00000000 ($0_{dec}$) |
| F010 [▶ 137]:0 | **SubIndex** | Module list | RW | 0x02 ($2_{dec}$) |
| | F010:01 | SubIndex 001 | RW | 0x00000118 ($280_{dec}$) |
| | F010:02 | SubIndex 002 | RW | 0x00000118 ($280_{dec}$) |

## Key

Flags:
RO = Read Only
RW = Read/Write

# 6.2 EP1816-0008 - Object description and parameterization

**Parameterization**

The terminal is parameterized via the CoE - Online tab (double-click on the respective object) or via the Process Data tab (allocation of PDOs).

**EtherCAT XML Device Description**

The display matches that of the CoE objects from the EtherCAT XML Device Description. We recommend downloading the latest XML file from the download area of the Beckhoff website (http://beckhoff.de/german/download/elconfg.htm?id=1983920606140) and installing it according to the installation instructions.

### Introduction

The CoE overview contains objects for different intended applications:

- Objects required for parameterization [▶ 133] during commissioning
- Objects intended for regular operation [▶ 133], e.g. through ADS access
- Objects for indicating internal settings [▶ 133] (may be fixed)

The following section first describes the objects required for normal operation, followed by a complete overview of missing objects.

### Objects to be parameterized during commissioning

Objects to be parameterized during commissioning

### Index 1011 Restore default parameters

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1011:0 | Restore default parameters | Restore default parameters | UINT8 | RO | 0x01 ($1_{dec}$) |
| 1011:01 | SubIndex 001 | If this object is set to **0x64616F6C** in the set value dialog, all backup objects are reset to their delivery state. | UINT32 | RW | 0x00000000 ($0_{dec}$) |

### Objects for regular operation

The EP1816 has no such objects.

### Additional objects

### Standard objects (0x1000-0x1FFF)

The standard objects have the same meaning for all EtherCAT slaves.

### Index 1000 Device type

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1000:0 | Device type | Device type of the EtherCAT slave: The Lo-Word contains the CoE profile used (5001). The Hi-Word contains the module profile according to the modular device profile. | UINT32 | RO | 0x01181389 ($18355081_{dec}$) |

### Index 1008 Device name

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1008:0 | Device name | Device name of the EtherCAT slave | string | RO | EP1816-0008 |

### Index 1009 Hardware version

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1009:0 | Hardware version | Hardware version of the EtherCAT slave | string | RO | 00 |

### Index 100A Software version

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 100A:0 | Software version | Firmware version of the EtherCAT slave | string | RO | 01 |

### Index 1018 Identity

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1018:0 | Identity | Information for identifying the slave | UINT8 | RO | 0x04 ($4_{dec}$) |
| 1018:01 | Vendor ID | Vendor ID of the EtherCAT slave | UINT32 | RO | 0x00000002 ($2_{dec}$) |
| 1018:02 | Product code | Product code of the EtherCAT slave | UINT32 | RO | 0x07184052 ($119029842_{dec}$) |
| 1018:03 | Revision | Revision number of the EtherCAT slave; the low word (bit 0-15) indicates the special terminal number, the high word (bit 16-31) refers to the device description | UINT32 | RO | 0x00100008 ($1048584_{dec}$) |
| 1018:04 | Serial number | Serial number of the EtherCAT slave; the low byte (bit 0-7) of the low word contains the year of production, the high byte (bit 8-15) of the low word contains the week of production, the high word (bit 16-31) is 0 | UINT32 | RO | 0x00000000 ($0_{dec}$) |

### Index 10F0 Backup parameter handling

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 10F0:0 | Backup parameter handling | Information for standardized loading and saving of backup entries | UINT8 | RO | 0x01 ($1_{dec}$) |
| 10F0:01 | Checksum | Checksum across all backup entries of the EtherCAT slave | UINT32 | RO | 0x00000000 ($0_{dec}$) |

### Index 1A00 DO TxPDO-Map Inputs Ch.1

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A00:0 | DO TxPDO-Map Inputs Ch.1 | PDO Mapping TxPDO 1 | UINT8 | RO | 0x0B ($11_{dec}$) |
| 1A00:01 | SubIndex 001 | 1. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x01 (Input 1)) | UINT32 | RO | 0x6000:01, 1 |
| 1A00:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x02 (Input 2)) | UINT32 | RO | 0x6000:02, 1 |
| 1A00:03 | SubIndex 003 | 3. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x03 (Input 3)) | UINT32 | RO | 0x6000:03, 1 |
| 1A00:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x04 (Input 4)) | UINT32 | RO | 0x6000:04, 1 |
| 1A00:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x05 (Input 5)) | UINT32 | RO | 0x6000:05, 1 |
| 1A00:06 | SubIndex 006 | 6. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x06 (Input 6)) | UINT32 | RO | 0x6000:06, 1 |
| 1A00:07 | SubIndex 007 | 7. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x07 (Input 7)) | UINT32 | RO | 0x6000:07, 1 |
| 1A00:08 | SubIndex 008 | 8. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x08 (Input 8)) | UINT32 | RO | 0x6000:08, 1 |
| 1A00:09 | SubIndex 009 | 9. PDO Mapping entry (5 bits align) | UINT32 | RO | 0x0000:00, 5 |
| 1A00:0A | SubIndex 010 | 10. PDO Mapping entry (object 0x1C32, entry 0x20) | UINT32 | RO | 0x1C32:20, 1 |
| 1A00:0B | SubIndex 011 | 11. PDO Mapping entry (2 bits align) | UINT32 | RO | 0x0000:00, 2 |

### Index 1A01 DO TxPDO-Map Inputs Ch.2

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A01:0 | DO TxPDO-Map Inputs Ch.2 | PDO Mapping TxPDO 2 | UINT8 | RO | 0x0B ($11_{dec}$) |
| 1A01:01 | SubIndex 001 | 1. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x01 (Input 1)) | UINT32 | RO | 0x6010:01, 1 |
| 1A01:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x02 (Input 2)) | UINT32 | RO | 0x6010:02, 1 |
| 1A01:03 | SubIndex 003 | 3. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x03 (Input 3)) | UINT32 | RO | 0x6010:03, 1 |
| 1A01:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x04 (Input 4)) | UINT32 | RO | 0x6010:04, 1 |
| 1A01:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x05 (Input 5)) | UINT32 | RO | 0x6010:05, 1 |
| 1A01:06 | SubIndex 006 | 6. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x06 (Input 6)) | UINT32 | RO | 0x6010:06, 1 |
| 1A01:07 | SubIndex 007 | 7. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x07 (Input 7)) | UINT32 | RO | 0x6010:07, 1 |
| 1A01:08 | SubIndex 008 | 8. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x08 (Input 8)) | UINT32 | RO | 0x6010:08, 1 |
| 1A01:09 | SubIndex 009 | 9. PDO Mapping entry (5 bits align) | UINT32 | RO | 0x0000:00, 5 |
| 1A01:0A | SubIndex 010 | 10. PDO Mapping entry (object 0x1C32, entry 0x20) | UINT32 | RO | 0x1C32:20, 1 |
| 1A01:0B | SubIndex 011 | 11. PDO Mapping entry (2 bits align) | UINT32 | RO | 0x0000:00, 2 |

### Index 1C00 Sync manager type

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C00:0 | Sync manager type | Using the sync managers | UINT8 | RO | 0x04 ($4_{dec}$) |
| 1C00:01 | SubIndex 001 | Sync-Manager Type Channel 1: Mailbox Write | UINT8 | RO | 0x01 ($1_{dec}$) |
| 1C00:02 | SubIndex 002 | Sync-Manager Type Channel 2: Mailbox Read | UINT8 | RO | 0x02 ($2_{dec}$) |
| 1C00:03 | SubIndex 003 | Sync-Manager Type Channel 3: Process Data Write (Outputs) | UINT8 | RO | 0x03 ($3_{dec}$) |
| 1C00:04 | SubIndex 004 | Sync-Manager Type Channel 4: Process Data Read (Inputs) | UINT8 | RO | 0x04 ($4_{dec}$) |

### Index 1C12 RxPDO assign

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C12:0 | RxPDO assign | PDO Assign Outputs | UINT8 | RO | 0x00 ($0_{dec}$) |

### Index 1C13 TxPDO assign

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C13:0 | TxPDO assign | PDO Assign Inputs | UINT8 | RO | 0x02 ($2_{dec}$) |
| 1C13:01 | Subindex 001 | 1. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A00 ($6656_{dec}$) |
| 1C13:02 | Subindex 002 | 2. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A01 ($6657_{dec}$) |

### Index 1C33 SM input parameter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C33:0 | SM input parameter | Synchronization parameters for the inputs | UINT8 | RO | 0x20 ($32_{dec}$) |
| 1C33:01 | Sync mode | Current synchronization mode:<br>• 0: Free Run<br>• 1: Synchronous with SM 3 Event (no outputs available)<br>• 2: DC - Synchron with SYNC0 Event<br>• 3: DC - Synchron with SYNC1 Event<br>• 34: Synchronous with SM 2 Event (outputs available) | UINT16 | RW | 0x0022 ($34_{dec}$) |
| 1C33:02 | Cycle time | Cycle time (in ns):<br>• Synchron with SM 2 Event: Master cycle time<br>• DC mode: SYNC0/SYNC1 Cycle Time | UINT32 | RW | 0x000186A0 ($100000_{dec}$) |
| 1C33:03 | Shift time | Time between SYNC0 event and reading of the inputs (in ns, only DC mode) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:04 | Sync modes supported | Supported synchronization modes:<br>• Bit 0: free run is supported<br>• Bit 1: Synchronous with SM 2 Event is supported (outputs available)<br>• Bit 1: Synchronous with SM 3 Event is supported (no outputs available)<br>• Bit 2-3 = 01: DC mode is supported<br>• Bit 4-5 = 01: Input shift through local event (outputs available)<br>• Bit 4-5 = 10: Input shift with SYNC1 event (no outputs available)<br>• Bit 14 = 1: dynamic times (measurement through writing of 1C32:08 [▶ 136] ) | UINT16 | RO | 0xC007 ($49159_{dec}$) |
| 1C33:05 | Minimum cycle time | Minimum cycle time (in ns) | UINT32 | RO | 0x000124F8 ($75000_{dec}$) |
| 1C33:06 | Calc and copy time | Time between reading of the inputs and availability of the inputs for the master (in ns, only DC mode) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:08 | Command | • 0: Measurement of the local cycle time is stopped<br>• 1: Measurement of the local cycle time is started<br>The entries 1C33:03 [▶ 136], 1C33:06 [▶ 136], 1C33:07, 1C33:09 [▶ 136] are updated with the maximum measured values.<br>For a subsequent measurement the measured values are reset | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C33:09 | Delay time | Time between SYNC1 event and reading of the inputs (in ns, only DC mode) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:0B | SM event missed counter | Number of missed SM events in OPERATIONAL (DC mode only) | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:0C | Cycle exceeded counter | Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early) | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:0D | Shift too short counter | Number of occasions that the interval between SYNC0 and SYNC1 event was too short (DC mode only) | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:20 | Sync error | The synchronization was not correct in the last cycle (outputs were output too late; DC mode only) | boolean | RO | 0x00 ($0_{dec}$) |

### Profile-specific objects (0x6000-0xFFFF)

The profile-specific objects have the same meaning for all EtherCAT slaves that support the profile 5001.

### Index 6000 DO Inputs Ch.1

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6000:0 | DO Inputs Ch.1 | | UINT8 | RO | 0x0E ($14_{dec}$) |
| 6000:01 | Input 1 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6000:02 | Input 2 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6000:03 | Input 3 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6000:04 | Input 4 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6000:05 | Input 5 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6000:06 | Input 6 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6000:07 | Input 7 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6000:08 | Input 8 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6000:0E | Sync Error | | boolean | RO | 0x00 ($0_{dec}$) |

### Index 6010 DO Inputs Ch.2

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6010:0 | DO Inputs Ch.2 | | UINT8 | RO | 0x0E ($14_{dec}$) |
| 6010:01 | Input 1 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6010:02 | Input 2 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6010:03 | Input 3 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6010:04 | Input 4 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6010:05 | Input 5 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6010:06 | Input 6 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6010:07 | Input 7 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6010:08 | Input 8 | | boolean | RO | 0x00 ($0_{dec}$) |
| 6010:0E | Sync Error | | boolean | RO | 0x00 ($0_{dec}$) |

### Index F000 Modular device profile

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F000:0 | Modular device profile | General information for the modular device profile | UINT8 | RO | 0x02 ($2_{dec}$) |
| F000:01 | Module index distance | Index distance of the objects of the individual channels | UINT16 | RO | 0x0010 ($16_{dec}$) |
| F000:02 | Maximum number of modules | Number of channels | UINT16 | RO | 0x0002 ($2_{dec}$) |

### Index F008 Code word

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F008:0 | Code word | | UINT32 | RW | 0x00000000 ($0_{dec}$) |

### Index F010 Module list

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F010:0 | Module list | | UINT8 | RW | 0x02 ($2_{dec}$) |
| F010:01 | SubIndex 001 | | UINT32 | RW | 0x00000118 ($280_{dec}$) |
| F010:02 | SubIndex 002 | | UINT32 | RW | 0x00000118 ($280_{dec}$) |

# 6.3 EP1816-3008 - Object overview

**EtherCAT XML Device Description**

The display matches that of the CoE objects from the EtherCAT XML Device Description. We recommend downloading the latest XML file from the download area on the Beckhoff website (http://www.beckhoff.de/german/default.htm?download/elconfg.htm) and installing it according to the installation instructions.

| Index (hex) | | Name | Flags | Default value |
|---|---|---|---|---|
| 1000 [▶ 146] | | Device type | RO | 0x00001389 (5001$_{dec}$) |
| 1008 [▶ 146] | | Device name | RO | EP1816-3008 |
| 1009 [▶ 146] | | Hardware version | RO | |
| 100A [▶ 146] | | Software version | RO | 03 |
| 1011:0 [▶ 146] | **Subindex** | Restore default parameters | RO | 0x01 (1$_{dec}$) |
| | 0x1011:01 | SubIndex 001 | RW | 0x00000000 (0$_{dec}$) |
| 1018:0 [▶ 146] | **Subindex** | Identity | RO | 0x04 (4$_{dec}$) |
| | 0x1018:01 | Vendor ID | RO | 0x00000002 (2$_{dec}$) |
| | 0x1018:02 | Product code | RO | 0x05E44052 (98844754$_{dec}$) |
| | 01018:03 | Revision | RO | 0x00000000 (0$_{dec}$) |
| | 0x1018:04 | Serial number | RO | 0x00000000 (0$_{dec}$) |
| 10F0:0 [▶ 146] | **Subindex** | Backup parameter handling | RO | 0x01 (1$_{dec}$) |
| | 0x10F0:01 | Checksum | RO | 0x00000000 (0$_{dec}$) |
| 1A00:0 [▶ 147] | **Subindex** | DIG TxPDO-Map Inputs Ch.1 | RO | 0x09 (9$_{dec}$) |
| | 0x1A00:01 | SubIndex 001 | RO | 0x6000:01, 1 |
| | 0x1A00:02 | SubIndex 002 | RO | 0x6000:02, 1 |
| | 0x1A00:03 | SubIndex 003 | RO | 0x6000:03, 1 |
| | 0x1A00:04 | SubIndex 004 | RO | 0x6000:04, 1 |
| | 0x1A00:05 | SubIndex 005 | RO | 0x6000:05, 1 |
| | 0x1A00:06 | SubIndex 006 | RO | 0x6000:06, 1 |
| | 0x1A00:07 | SubIndex 007 | RO | 0x6000:07, 1 |
| | 0x1A00:08 | SubIndex 008 | RO | 0x6000:08, 1 |
| | 0x1A00:09 | SubIndex 009 | RO | 0x0000:00, 8 |
| 1A01:0 [▶ 147] | **Subindex** | DIG TxPDO-Map Inputs Ch.2 | RO | 0x09 (9$_{dec}$) |
| | 0x1A01:01 | SubIndex 001 | RO | 0x6010:01, 1 |
| | 0x1A01:02 | SubIndex 002 | RO | 0x6010:02, 1 |
| | 0x1A01:03 | SubIndex 003 | RO | 0x6010:03, 1 |
| | 0x1A01:04 | SubIndex 004 | RO | 0x6010:04, 1 |
| | 0x1A01:05 | SubIndex 005 | RO | 0x6010:05, 1 |
| | 0x1A01:06 | SubIndex 006 | RO | 0x6010:06, 1 |
| | 0x1A01:07 | SubIndex 007 | RO | 0x6010:07, 1 |
| | 0x1A01:08 | SubIndex 008 | RO | 0x6010:08, 1 |
| | 0x1A01:09 | SubIndex 009 | RO | 0x0000:00, 8 |
| 1A02:0 [▶ 147] | **Subindex** | AI TxPDO-Map Inputs Ch.1 | RO | 0x05 (5$_{dec}$) |
| | 0x1A02:01 | SubIndex 001 | RO | 0x0000:00, 6 |
| | 0x1A02:02 | SubIndex 002 | RO | 0x6020:07, 1 |
| | 0x1A02:03 | SubIndex 003 | RO | 0x0000:00, 8 |
| | 0x1A02:04 | SubIndex 004 | RO | 0x6020:10, 1 |
| | 0x1A02:05 | SubIndex 005 | RO | 0x6020:11, 16 |
| 1A03:0 [▶ 148] | **Subindex** | AI TxPDO-Map Inputs Ch.2 | RO | 0x05 (5$_{dec}$) |
| | 0x1A03:01 | SubIndex 001 | RO | 0x0000:00, 6 |
| | 0x1A03:02 | SubIndex 002 | RO | 0x6030:07, 1 |
| | 0x1A03:03 | SubIndex 003 | RO | 0x0000:00, 8 |
| | 0x1A03:04 | SubIndex 004 | RO | 0x6030:10, 1 |
| | 0x1A03:05 | SubIndex 005 | RO | 0x6030:11, 16 |

| Index (hex) | | Name | Flags | Default value |
|---|---|---|---|---|
| 1A04:0 [▶ 148] | **Subindex** | AI TxPDO-Map Inputs Ch.3 | RO | 0x05 ($5_{dec}$) |
| | 0x1A04:01 | SubIndex 001 | RO | 0x0000:00, 6 |
| | 0x1A04:02 | SubIndex 002 | RO | 0x6040:07, 1 |
| | 0x1A04:03 | SubIndex 003 | RO | 0x0000:00, 8 |
| | 0x1A04:04 | SubIndex 004 | RO | 0x6040:10, 1 |
| | 0x1A04:05 | SubIndex 005 | RO | 0x6040:11, 16 |
| 1A05:0 [▶ 148] | **Subindex** | AI TxPDO-Map Inputs Ch.4 | RO | 0x05 ($5_{dec}$) |
| | 0x1A05:01 | SubIndex 001 | RO | 0x0000:00, 6 |
| | 0x1A05:02 | SubIndex 002 | RO | 0x6050:07, 1 |
| | 0x1A05:03 | SubIndex 003 | RO | 0x0000:00, 8 |
| | 0x1A05:04 | SubIndex 004 | RO | 0x6050:10, 1 |
| | 0x1A05:05 | SubIndex 005 | RO | 0x6050:11, 16 |
| 1A06:0 [▶ 148] | **Subindex** | AI TxPDO-Map Inputs Ch.5 | RO | 0x05 ($5_{dec}$) |
| | 0x1A06:01 | SubIndex 001 | RO | 0x0000:00, 6 |
| | 0x1A06:02 | SubIndex 002 | RO | 0x6060:07, 1 |
| | 0x1A06:03 | SubIndex 003 | RO | 0x0000:00, 8 |
| | 0x1A06:04 | SubIndex 004 | RO | 0x6060:10, 1 |
| | 0x1A06:05 | SubIndex 005 | RO | 0x6060:11, 16 |
| 1A07:0 [▶ 149] | **Subindex** | AI TxPDO-Map Inputs Ch.6 | RO | 0x05 ($5_{dec}$) |
| | 0x1A07:01 | SubIndex 001 | RO | 0x0000:00, 6 |
| | 0x1A07:02 | SubIndex 002 | RO | 0x6070:07, 1 |
| | 0x1A07:03 | SubIndex 003 | RO | 0x0000:00, 8 |
| | 0x1A07:04 | SubIndex 004 | RO | 0x6070:10, 1 |
| | 0x1A07:05 | SubIndex 005 | RO | 0x6070:11, 16 |
| 1A08:0 [▶ 149] | **Subindex** | DIG TxPDO-Map Inputs Device | RO | 0x04 ($4_{dec}$) |
| | 0x1A08:01 | SubIndex 001 | RO | 0xF600:01, 1 |
| | 0x1A08:02 | SubIndex 002 | RO | 0xF600:02, 1 |
| | 0x1A08:03 | SubIndex 003 | RO | 0x0000:00, 13 |
| | 0x1A08:04 | SubIndex 004 | RO | 0xF600:10, 1 |
| 1C00:0 [▶ 149] | **Subindex** | Sync manager type | RO | 0x04 ($4_{dec}$) |
| | 0x1C00:01 | SubIndex 001 | RO | 0x01 ($1_{dec}$) |
| | 0x1C00:02 | SubIndex 002 | RO | 0x02 ($2_{dec}$) |
| | 0x1C00:03 | SubIndex 003 | RO | 0x03 ($3_{dec}$) |
| | 0x1C00:04 | SubIndex 004 | RO | 0x04 ($4_{dec}$) |
| 1C12:0 [▶ 149] | **Subindex** | RxPDO assign | RO | 0x00 ($0_{dec}$) |
| 1C13:0 [▶ 149] | **Subindex** | TxPDO assign | RO | 0x09 ($9_{dec}$) |
| | 0x1C13:01 | SubIndex 001 | RO | 0x1A00 ($6656_{dec}$) |
| | 0x1C13:02 | SubIndex 002 | RO | 0x1A01 ($6657_{dec}$) |
| | 0x1C13:03 | SubIndex 003 | RO | 0x1A02 ($6658_{dec}$) |
| | 0x1C13:04 | SubIndex 004 | RO | 0x1A03 ($6659_{dec}$) |
| | 0x1C13:05 | SubIndex 005 | RO | 0x1A04 ($6660_{dec}$) |
| | 0x1C13:06 | SubIndex 006 | RO | 0x1A05 ($6661_{dec}$) |
| | 0x1C13:07 | SubIndex 007 | RO | 0x1A06 ($6662_{dec}$) |
| | 0x1C13:08 | SubIndex 008 | RO | 0x1A07 ($6663_{dec}$) |
| | 0x1C13:09 | SubIndex 009 | RO | 0x1A08 ($6664_{dec}$) |

| Index (hex) | | Name | Flags | Default value |
|---|---|---|---|---|
| 1C33:0 [▶ 150] | **Subindex** | SM input parameter | RO | 0x20 ($32_{dec}$) |
| | 0x1C33:01 | Sync mode | RW | 0x0022 ($34_{dec}$) |
| | 0x1C33:02 | Cycle time | RW | 0x003D0900 ($4000000_{dec}$) |
| | 0x1C33:03 | Shift time | RO | 0x00000000 ($0_{dec}$) |
| | 0x1C33:04 | Sync modes supported | RO | 0xC007 ($49159_{dec}$) |
| | 0x1C33:05 | Minimum cycle time | RO | 0x00030D40 ($200000_{dec}$) |
| | 0x1C33:06 | Calc and copy time | RO | 0x00000000 ($0_{dec}$) |
| | 0x1C33:07 | Minimum delay time | RO | 0x00000000 ($0_{dec}$) |
| | 0x1C33:08 | Command | RW | 0x0000 ($0_{dec}$) |
| | 0x1C33:09 | Maximum delay time | RO | 0x00000000 ($0_{dec}$) |
| | 0x1C33:0B | SM event missed counter | RO | 0x0000 ($0_{dec}$) |
| | 0x1C33:0C | Cycle exceeded counter | RO | 0x0000 ($0_{dec}$) |
| | 0x1C33:0D | Shift too short counter | RO | 0x0000 ($0_{dec}$) |
| | 0x1C33:20 | Sync error | RO | 0x00 ($0_{dec}$) |
| 6000:0 [▶ 151] | **Subindex** | DIG Inputs Ch.1 | RO | 0x08 ($8_{dec}$) |
| | 0x6000:01 | Input 1 | RO | 0x00 ($0_{dec}$) |
| | 0x6000:02 | Input 2 | RO | 0x00 ($0_{dec}$) |
| | 0x6000:03 | Input 3 | RO | 0x00 ($0_{dec}$) |
| | 0x6000:04 | Input 4 | RO | 0x00 ($0_{dec}$) |
| | 0x6000:05 | Input 5 | RO | 0x00 ($0_{dec}$) |
| | 0x6000:06 | Input 6 | RO | 0x00 ($0_{dec}$) |
| | 0x6000:07 | Input 7 | RO | 0x00 ($0_{dec}$) |
| | 0x6000:08 | Input 8 | RO | 0x00 ($0_{dec}$) |
| 6010:0 [▶ 151] | **Subindex** | DIG Inputs Ch.2 | RO | 0x08 ($8_{dec}$) |
| | 0x6010:01 | Input 1 | RO | 0x00 ($0_{dec}$) |
| | 0x6010:02 | Input 2 | RO | 0x00 ($0_{dec}$) |
| | 0x6010:03 | Input 3 | RO | 0x00 ($0_{dec}$) |
| | 0x6010:04 | Input 4 | RO | 0x00 ($0_{dec}$) |
| | 0x6010:05 | Input 5 | RO | 0x00 ($0_{dec}$) |
| | 0x6010:06 | Input 6 | RO | 0x00 ($0_{dec}$) |
| | 0x6010:07 | Input 7 | RO | 0x00 ($0_{dec}$) |
| | 0x6010:08 | Input 8 | RO | 0x00 ($0_{dec}$) |
| 6020:0 [▶ 151] | **Subindex** | AI Inputs Ch.1 | RO | 0x11 ($17_{dec}$) |
| | 0x6020:07 | Error | RO | 0x00 ($0_{dec}$) |
| | 0x6020:10 | TxPDO Toggle | RO | 0x00 ($0_{dec}$) |
| | 0x6020:11 | Value | RO | 0x0000 ($0_{dec}$) |
| 6030:0 [▶ 151] | **Subindex** | AI Inputs Ch.2 | RO | 0x11 ($17_{dec}$) |
| | 0x6030:07 | Error | RO | 0x00 ($0_{dec}$) |
| | 0x6030:10 | TxPDO Toggle | RO | 0x00 ($0_{dec}$) |
| | 0x6030:11 | Value | RO | 0x0000 ($0_{dec}$) |
| 6040:0 [▶ 151] | **Subindex** | AI Inputs Ch.3 | RO | 0x11 ($17_{dec}$) |
| | 0x6040:07 | Error | RO | 0x00 ($0_{dec}$) |
| | 0x6040:10 | TxPDO Toggle | RO | 0x00 ($0_{dec}$) |
| | 0x6040:11 | Value | RO | 0x0000 ($0_{dec}$) |
| 6050:0 [▶ 152] | **Subindex** | AI Inputs Ch.4 | RO | 0x11 ($17_{dec}$) |
| | 0x6050:07 | Error | RO | 0x00 ($0_{dec}$) |
| | 0x6050:10 | TxPDO Toggle | RO | 0x00 ($0_{dec}$) |
| | 0x6050:11 | Value | RO | 0x0000 ($0_{dec}$) |
| 6060:0 [▶ 152] | **Subindex** | AI Inputs Ch.5 | RO | 0x11 ($17_{dec}$) |
| | 0x6060:07 | Error | RO | 0x00 ($0_{dec}$) |
| | 0x6060:10 | TxPDO Toggle | RO | 0x00 ($0_{dec}$) |
| | 0x6060:11 | Value | RO | 0x0000 ($0_{dec}$) |
| 6070:0 [▶ 152] | **Subindex** | AI Inputs Ch.6 | RO | 0x11 ($17_{dec}$) |
| | 0x6070:07 | Error | RO | 0x00 ($0_{dec}$) |
| | 0x6070:10 | TxPDO Toggle | RO | 0x00 ($0_{dec}$) |
| | 0x6070:11 | Value | RO | 0x0000 ($0_{dec}$) |

| Index (hex) | | Name | Flags | Default value |
|---|---|---|---|---|
| 8020:0 [▶ 143] | **Subindex** | AI Settings Ch.1 | RW | 0x18 ($24_{dec}$) |
| | 0x8020:01 | Enable user scale | RW | 0x00 ($0_{dec}$) |
| | 0x8020:0A | Enable user calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8020:0B | Enable vendor calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8020:11 | User scale offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8020:12 | User scale gain | RW | 0x02A00000 ($44040192_{dec}$) |
| | 0x8020:17 | User calibration offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8020:18 | User calibration gain | RW | 0x0000 ($0_{dec}$) |
| 802F:0 [▶ 143] | **Subindex** | AI Vendor data Ch.1 | RW | 0x02 ($2_{dec}$) |
| | 0x802F:01 | Calibration Offset | RW | 0x0000 ($0_{dec}$) |
| | 0x802F:02 | Calibration Gain | RW | 0x0000 ($0_{dec}$) |
| 8030:0 [▶ 143] | **Subindex** | AI Settings Ch.2 | RW | 0x18 ($24_{dec}$) |
| | 0x8030:01 | Enable user scale | RW | 0x00 ($0_{dec}$) |
| | 0x8030:0A | Enable user calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8030:0B | Enable vendor calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8030:11 | User scale offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8030:12 | User scale gain | RW | 0x02A00000 ($44040192_{dec}$) |
| | 0x8030:17 | User calibration offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8030:18 | User calibration gain | RW | 0x0000 ($0_{dec}$) |
| 803F:0 [▶ 143] | **Subindex** | AI Vendor data Ch.2 | RW | 0x02 ($2_{dec}$) |
| | 0x803F:01 | Calibration Offset | RW | 0x0000 ($0_{dec}$) |
| | 0x803F:02 | Calibration Gain | RW | 0x0000 ($0_{dec}$) |
| 8040:0 [▶ 144] | **Subindex** | AI Settings Ch.3 | RW | 0x18 ($24_{dec}$) |
| | 0x8040:01 | Enable user scale | RW | 0x00 ($0_{dec}$) |
| | 0x8040:0A | Enable user calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8040:0B | Enable vendor calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8040:11 | User scale offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8040:12 | User scale gain | RW | 0x02A00000 ($44040192_{dec}$) |
| | 0x8040:17 | User calibration offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8040:18 | User calibration gain | RW | 0x0000 ($0_{dec}$) |
| 804F:0 [▶ 144] | **Subindex** | AI Vendor data Ch.3 | RW | 0x02 ($2_{dec}$) |
| | 0x804F:01 | Calibration Offset | RW | 0x0000 ($0_{dec}$) |
| | 0x804F:02 | Calibration Gain | RW | 0x0000 ($0_{dec}$) |
| 8050:0 [▶ 144] | **Subindex** | AI Settings Ch.4 | RW | 0x18 ($24_{dec}$) |
| | 0x8050:01 | Enable user scale | RW | 0x00 ($0_{dec}$) |
| | 0x8050:0A | Enable user calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8050:0B | Enable vendor calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8050:11 | User scale offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8050:12 | User scale gain | RW | 0x02A00000 ($44040192_{dec}$) |
| | 0x8050:17 | User calibration offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8050:18 | User calibration gain | RW | 0x0000 ($0_{dec}$) |
| 805F:0 [▶ 144] | **Subindex** | AI Vendor data Ch.4 | RW | 0x02 ($2_{dec}$) |
| | 0x805F:01 | Calibration Offset | RW | 0x0000 ($0_{dec}$) |
| | 0x805F:02 | Calibration Gain | RW | 0x0000 ($0_{dec}$) |
| 8060:0 [▶ 144] | **Subindex** | AI Settings Ch.5 | RW | 0x18 ($24_{dec}$) |
| | 0x8060:01 | Enable user scale | RW | 0x00 ($0_{dec}$) |
| | 0x8060:0A | Enable user calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8060:0B | Enable vendor calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8060:11 | User scale offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8060:12 | User scale gain | RW | 0x02A00000 ($44040192_{dec}$) |
| | 0x8060:17 | User calibration offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8060:18 | User calibration gain | RW | 0x0000 ($0_{dec}$) |
| 806F:0 [▶ 145] | **Subindex** | AI Vendor data Ch.5 | RW | 0x02 ($2_{dec}$) |
| | 0x806F:01 | Calibration Offset | RW | 0x0000 ($0_{dec}$) |
| | 0x806F:02 | Calibration Gain | RW | 0x0000 ($0_{dec}$) |

| Index (hex) | | Name | Flags | Default value |
|---|---|---|---|---|
| 8070:0 [▶ 145] | **Subindex** | AI Settings Ch.6 | RW | 0x18 ($24_{dec}$) |
| | 0x8070:01 | Enable user scale | RW | 0x00 ($0_{dec}$) |
| | 0x8070:0A | Enable user calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8070:0B | Enable vendor calibration | RW | 0x00 ($0_{dec}$) |
| | 0x8070:11 | User scale offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8070:12 | User scale gain | RW | 0x02A00000 ($44040192_{dec}$) |
| | 0x8070:17 | User calibration offset | RW | 0x0000 ($0_{dec}$) |
| | 0x8070:18 | User calibration gain | RW | 0x0000 ($0_{dec}$) |
| 807F:0 [▶ 145] | **Subindex** | AI Vendor data Ch.6 | RW | 0x02 ($2_{dec}$) |
| | 0x807F:01 | Calibration Offset | RW | 0x0000 ($0_{dec}$) |
| | 0x807F:02 | Calibration Gain | RW | 0x0000 ($0_{dec}$) |
| 8080:0 [▶ 145] | **Subindex** | SAI Settings | RW | 0x11 ($17_{dec}$) |
| | 0x8080:0D | Mode | RW | 0x0000 ($0_{dec}$) |
| | 0x8080:11 | Range | RW | 0x0000 ($0_{dec}$) |
| F000:0 [▶ 152] | **Subindex** | Modular device profile | RO | 0x02 ($2_{dec}$) |
| | 0xF000:01 | Module index distance | RO | 0x0010 ($16_{dec}$) |
| | 0xF000:02 | Maximum number of modules | RO | 0x0009 ($9_{dec}$) |
| F008 [▶ 152] | | Code word | RW | 0x00000000 ($0_{dec}$) |
| F010:0 [▶ 152] | **Subindex** | Module list | RW | 0x09 ($9_{dec}$) |
| | 0xF010:01 | SubIndex 001 | RW | 0x00000118 ($280_{dec}$) |
| | 0xF010:02 | SubIndex 002 | RW | 0x00000118 ($280_{dec}$) |
| | 0xF010:03 | SubIndex 003 | RW | 0x0000012C ($300_{dec}$) |
| | 0xF010:04 | SubIndex 004 | RW | 0x0000012C ($300_{dec}$) |
| | 0xF010:05 | SubIndex 005 | RW | 0x0000012C ($300_{dec}$) |
| | 0xF010:06 | SubIndex 006 | RW | 0x0000012C ($300_{dec}$) |
| | 0xF010:07 | SubIndex 007 | RW | 0x0000012C ($300_{dec}$) |
| | 0xF010:08 | SubIndex 008 | RW | 0x0000012C ($300_{dec}$) |
| | 0xF010:09 | SubIndex 009 | RW | 0x00000168 ($360_{dec}$) |
| F600:0 [▶ 153] | **Subindex** | DIG Inputs | RO | 0x10 ($16_{dec}$) |
| | 0xF600:01 | Us Undervoltage | RO | 0x00 ($0_{dec}$) |
| | 0xF600:02 | Up Undervoltage | RO | 0x00 ($0_{dec}$) |
| | 0xF600:10 | TxPDO Toggle | RO | 0x00 ($0_{dec}$) |

### Key

Flags:
RO (Read Only): this object can be read only
RW (Read/Write): this object can be read and written to

## 6.4 EP1816-3008 - Object description and parameterization

**Parameterization**

The terminal is parameterized via the CoE - Online tab (double-click on the respective object) or via the Process Data tab (allocation of PDOs).

**EtherCAT XML Device Description**

The display matches that of the CoE objects from the EtherCAT XML Device Description. We recommend downloading the latest XML file from the download area of the Beckhoff website and installing it according to installation instructions.

### Introduction

The CoE overview contains objects for different intended applications:

- Objects required for parameterization during [▶ 143] commissioning

- Objects for indicating internal settings [▶ 145] (may be fixed)
- Further profile-specific objects [▶ 151]indicating inputs, outputs and status information

The following section first describes the objects required for normal operation, followed by a complete overview of missing objects.

## 6.4.1 Objects to be parameterized during commissioning

### Index 8020 AI Settings Ch.1

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8020:0 | AI Settings Ch.1 | | UINT8 | RO | 0x18 ($24_{dec}$) |
| 8020:01 | Enable user scale | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8020:0A | Enable user calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8020:0B | Enable vendor calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8020:11 | User scale offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8020:12 | User scale gain | | INT32 | RW | 0x02A00000 ($44040192_{dec}$) |
| 8020:17 | User calibration offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8020:18 | User calibration gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 802F AI Vendor data Ch.1

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 802F:0 | AI Vendor data Ch.1 | | UINT8 | RO | 0x02 ($2_{dec}$) |
| 802F:01 | Calibration Offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 802F:02 | Calibration Gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 8030 AI Settings Ch.2

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8030:0 | AI Settings Ch.2 | | UINT8 | RO | 0x18 ($24_{dec}$) |
| 8030:01 | Enable user scale | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8030:0A | Enable user calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8030:0B | Enable vendor calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8030:11 | User scale offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8030:12 | User scale gain | | INT32 | RW | 0x02A00000 ($44040192_{dec}$) |
| 8030:17 | User calibration offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8030:18 | User calibration gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 803F AI Vendor data Ch.2

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 803F:0 | AI Vendor data Ch.2 | | UINT8 | RO | 0x02 ($2_{dec}$) |
| 803F:01 | Calibration Offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 803F:02 | Calibration Gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 8040 AI Settings Ch.3

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8040:0 | AI Settings Ch.3 | | UINT8 | RO | 0x18 ($24_{dec}$) |
| 8040:01 | Enable user scale | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8040:0A | Enable user calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8040:0B | Enable vendor calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8040:11 | User scale offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8040:12 | User scale gain | | INT32 | RW | 0x02A00000 ($44040192_{dec}$) |
| 8040:17 | User calibration offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8040:18 | User calibration gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 804F AI Vendor data Ch.3

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 804F:0 | AI Vendor data Ch.3 | | UINT8 | RO | 0x02 ($2_{dec}$) |
| 804F:01 | Calibration Offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 804F:02 | Calibration Gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 8050 AI Settings Ch.4

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8050:0 | AI Settings Ch.4 | | UINT8 | RO | 0x18 ($24_{dec}$) |
| 8050:01 | Enable user scale | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8050:0A | Enable user calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8050:0B | Enable vendor calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8050:11 | User scale offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8050:12 | User scale gain | | INT32 | RW | 0x02A00000 ($44040192_{dec}$) |
| 8050:17 | User calibration offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8050:18 | User calibration gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 805F AI Vendor data Ch.4

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 805F:0 | AI Vendor data Ch.4 | | UINT8 | RO | 0x02 ($2_{dec}$) |
| 805F:01 | Calibration Offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 805F:02 | Calibration Gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 8060 AI Settings Ch.5

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8060:0 | AI Settings Ch.5 | | UINT8 | RO | 0x18 ($24_{dec}$) |
| 8060:01 | Enable user scale | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8060:0A | Enable user calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8060:0B | Enable vendor calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8060:11 | User scale offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8060:12 | User scale gain | | INT32 | RW | 0x02A00000 ($44040192_{dec}$) |
| 8060:17 | User calibration offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8060:18 | User calibration gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 806F AI Vendor data Ch.5

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 806F:0 | AI Vendor data Ch.5 | | UINT8 | RO | 0x02 ($2_{dec}$) |
| 806F:01 | Calibration Offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 806F:02 | Calibration Gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 8070 AI Settings Ch.6

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8070:0 | AI Settings Ch.6 | | UINT8 | RO | 0x18 ($24_{dec}$) |
| 8070:01 | Enable user scale | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8070:0A | Enable user calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8070:0B | Enable vendor calibration | | BOOLEAN | RW | 0x00 ($0_{dec}$) |
| 8070:11 | User scale offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8070:12 | User scale gain | | INT32 | RW | 0x02A00000 ($44040192_{dec}$) |
| 8070:17 | User calibration offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 8070:18 | User calibration gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 807F AI Vendor data Ch.6

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 807F:0 | AI Vendor data Ch.6 | | UINT8 | RO | 0x02 ($2_{dec}$) |
| 807F:01 | Calibration Offset | | INT16 | RW | 0x0000 ($0_{dec}$) |
| 807F:02 | Calibration Gain | | INT16 | RW | 0x0000 ($0_{dec}$) |

### Index 8080 SAI Settings

| Index (hex) | Name | Meaning | | Data type | Flags | Default |
|---|---|---|---|---|---|---|
| 8080:0 | SAI Settings | | | UINT8 | RO | 0x11 ($17_{dec}$) |
| 8080:0D | Mode | permitted values: | | UINT16 | RW | 0x0000 ($0_{dec}$) |
| | | 4 | 1 Hz | | | |
| | | 5 | 10 Hz | | | |
| | | 6 | 25 Hz | | | |
| | | 7 | 50 Hz | | | |
| | | 8 | 100 Hz | | | |
| | | 9 | 200 Hz | | | |
| | | 10 | 400 Hz | | | |
| | | 11 | 1600 Hz | | | |
| | | 12 | 5000 Hz | | | |
| 8080:11 | Range | permitted values: | | UINT16 | RW | 0x0000 ($0_{dec}$) |
| | | 3 | +/- 2G | | | |
| | | 4 | +/- 4G | | | |
| | | 5 | +/- 8G | | | |
| | | 6 | +/-16G | | | |

## 6.4.2 Standard objects (0x1000-0x1FFF)

The standard objects have the same meaning for all EtherCAT slaves.

### Index 1000Device type

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1000:0 | Device type | Device type of the EtherCAT slave: The Lo-Word contains the CoE profile used (5001). The Hi-Word contains the module profile according to the modular device profile. | UINT32 | RO | 0x00001389 ($5001_{dec}$) |

### Index 1008Device name

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1008:0 | Device name | Device name of the EtherCAT slave | STRING | RO | EP1816-3008 |

### Index 1009Hardware version

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1009:0 | Hardware version | Hardware version of the EtherCAT slave | STRING | RO | |

### Index 100ASoftware version

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 100A:0 | Software version | Firmware version of the EtherCAT slave | STRING | RO | 03 |

### Index 1011 Restore default parameters

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1011:0 | Restore default parameters | | UINT8 | RO | 0x01 ($1_{dec}$) |
| 1011:01 | SubIndex 001 | | UINT32 | RW | 0x00000000 ($0_{dec}$) |

### Index 1018Identity

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1018:0 | Identity | Information for identifying the slave | UINT8 | RO | 0x04 ($4_{dec}$) |
| 1018:01 | Vendor ID | Vendor ID of the EtherCAT slave | UINT32 | RO | 0x00000002 ($2_{dec}$) |
| 1018:02 | Product code | Product code of the EtherCAT slave | UINT32 | RO | 0x05E44052 ($98844754_{dec}$) |
| 1018:03 | Revision | Revision number of the EtherCAT slave; the low word (bit 0-15) indicates the special terminal number, the high word (bit 16-31) refers to the device description | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1018:04 | Serial number | Serial number of the EtherCAT slave; the low byte (bit 0-7) of the low word contains the year of production, the high byte (bit 8-15) of the low word contains the week of production, the high word (bit 16-31) is 0 | UINT32 | RO | 0x00000000 ($0_{dec}$) |

### Index 10F0 Backup parameter handling

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 10F0:0 | Backup parameter handling | | UINT8 | RO | 0x01 ($1_{dec}$) |
| 10F0:01 | Checksum | | UINT32 | RO | 0x00000000 ($0_{dec}$) |

### Index 1A00 DIG TxPDO-Map Inputs Ch.1

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A00:0 | DIG TxPDO-Map Inputs Ch.1 | PDO Mapping TxPDO 1 | UINT8 | RO | 0x09 ($9_{dec}$) |
| 1A00:01 | SubIndex 001 | 1. PDO Mapping entry (object 0x6000 (DIG Inputs Ch.1), entry 0x01 (Input 1)) | UINT32 | RO | 0x6000:01, 1 |
| 1A00:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x6000 (DIG Inputs Ch.1), entry 0x02 (Input 2)) | UINT32 | RO | 0x6000:02, 1 |
| 1A00:03 | SubIndex 003 | 3. PDO Mapping entry (object 0x6000 (DIG Inputs Ch.1), entry 0x03 (Input 3)) | UINT32 | RO | 0x6000:03, 1 |
| 1A00:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6000 (DIG Inputs Ch.1), entry 0x04 (Input 4)) | UINT32 | RO | 0x6000:04, 1 |
| 1A00:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6000 (DIG Inputs Ch.1), entry 0x05 (Input 5)) | UINT32 | RO | 0x6000:05, 1 |
| 1A00:06 | SubIndex 006 | 6. PDO Mapping entry (object 0x6000 (DIG Inputs Ch.1), entry 0x06 (Input 6)) | UINT32 | RO | 0x6000:06, 1 |
| 1A00:07 | SubIndex 007 | 7. PDO Mapping entry (object 0x6000 (DIG Inputs Ch.1), entry 0x07 (Input 7)) | UINT32 | RO | 0x6000:07, 1 |
| 1A00:08 | SubIndex 008 | 8. PDO Mapping entry (object 0x6000 (DIG Inputs Ch.1), entry 0x08 (Input 8)) | UINT32 | RO | 0x6000:08, 1 |
| 1A00:09 | SubIndex 009 | 9. PDO Mapping entry (5 bits align) | UINT32 | RO | 0x0000:00, 8 |

### Index 1A01 DIG TxPDO-Map Inputs Ch.2

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A01:0 | DIG TxPDO-Map Inputs Ch.2 | PDO Mapping TxPDO 2 | UINT8 | RO | 0x09 ($9_{dec}$) |
| 1A01:01 | SubIndex 001 | 1. PDO Mapping entry (object 0x6010 (DIG Inputs Ch.2), entry 0x01 (Input 1)) | UINT32 | RO | 0x6010:01, 1 |
| 1A01:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x6010 (DIG Inputs Ch.2), entry 0x02 (Input 2)) | UINT32 | RO | 0x6010:02, 1 |
| 1A01:03 | SubIndex 003 | 3. PDO Mapping entry (object 0x6010 (DIG Inputs Ch.2), entry 0x03 (Input 3)) | UINT32 | RO | 0x6010:03, 1 |
| 1A01:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6010 (DIG Inputs Ch.2), entry 0x04 (Input 4)) | UINT32 | RO | 0x6010:04, 1 |
| 1A01:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6010 (DIG Inputs Ch.2), entry 0x05 (Input 5)) | UINT32 | RO | 0x6010:05, 1 |
| 1A01:06 | SubIndex 006 | 6. PDO Mapping entry (object 0x6010 (DIG Inputs Ch.2), entry 0x06 (Input 6)) | UINT32 | RO | 0x6010:06, 1 |
| 1A01:07 | SubIndex 007 | 7. PDO Mapping entry (object 0x6010 (DIG Inputs Ch.2), entry 0x07 (Input 7)) | UINT32 | RO | 0x6010:07, 1 |
| 1A01:08 | SubIndex 008 | 8. PDO Mapping entry (object 0x6010 (DIG Inputs Ch.2), entry 0x08 (Input 8)) | UINT32 | RO | 0x6010:08, 1 |
| 1A01:09 | SubIndex 009 | 9. PDO Mapping entry (5 bits align) | UINT32 | RO | 0x0000:00, 8 |

### Index 1A02 AI TxPDO-Map Inputs Ch.1

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A02:0 | AI TxPDO-Map Inputs Ch.1 | PDO Mapping TxPDO 3 | UINT8 | RO | 0x05 ($5_{dec}$) |
| 1A02:01 | SubIndex 001 | 1. PDO Mapping entry (13 bits align) | UINT32 | RO | 0x0000:00, 6 |
| 1A02:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x1C33 (SM input parameter), entry 0x20 (Sync error)) | UINT32 | RO | 0x6020:07, 1 |
| 1A02:03 | SubIndex 003 | 3. PDO Mapping entry (1 bits align) | UINT32 | RO | 0x0000:00, 8 |
| 1A02:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6020 (AI Inputs Ch.1), entry 0x10 (TxPDO Toggle)) | UINT32 | RO | 0x6020:10, 1 |
| 1A02:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6020 (AI Inputs Ch.1), entry 0x11 (Value)) | UINT32 | RO | 0x6020:11, 16 |

### Index 1A03 AI TxPDO-Map Inputs Ch.2

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A03:0 | AI TxPDO-Map Inputs Ch.2 | PDO Mapping TxPDO 4 | UINT8 | RO | 0x05 ($5_{dec}$) |
| 1A03:01 | SubIndex 001 | 1. PDO Mapping entry (13 bits align) | UINT32 | RO | 0x0000:00, 6 |
| 1A03:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x1C33 (SM input parameter), entry 0x20 (Sync error)) | UINT32 | RO | 0x6030:07, 1 |
| 1A03:03 | SubIndex 003 | 3. PDO Mapping entry (1 bits align) | UINT32 | RO | 0x0000:00, 8 |
| 1A03:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6030 (AI Inputs Ch.2), entry 0x10 (TxPDO Toggle)) | UINT32 | RO | 0x6030:10, 1 |
| 1A03:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6030 (AI Inputs Ch.2), entry 0x11 (Value)) | UINT32 | RO | 0x6030:11, 16 |

### Index 1A04 AI TxPDO-Map Inputs Ch.3

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A04:0 | AI TxPDO-Map Inputs Ch.3 | PDO Mapping TxPDO 5 | UINT8 | RO | 0x05 ($5_{dec}$) |
| 1A04:01 | SubIndex 001 | 1. PDO Mapping entry (13 bits align) | UINT32 | RO | 0x0000:00, 6 |
| 1A04:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x1C33 (SM input parameter), entry 0x20 (Sync error)) | UINT32 | RO | 0x6040:07, 1 |
| 1A04:03 | SubIndex 003 | 3. PDO Mapping entry (1 bits align) | UINT32 | RO | 0x0000:00, 8 |
| 1A04:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6040 (AI Inputs Ch.3), entry 0x10 (TxPDO Toggle)) | UINT32 | RO | 0x6040:10, 1 |
| 1A04:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6040 (AI Inputs Ch.3), entry 0x11 (Value)) | UINT32 | RO | 0x6040:11, 16 |

### Index 1A05 AI TxPDO-Map Inputs Ch.4

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A05:0 | AI TxPDO-Map Inputs Ch.4 | PDO Mapping TxPDO 6 | UINT8 | RO | 0x05 ($5_{dec}$) |
| 1A05:01 | SubIndex 001 | 1. PDO Mapping entry (13 bits align) | UINT32 | RO | 0x0000:00, 6 |
| 1A05:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x1C33 (SM input parameter), entry 0x20 (Sync error)) | UINT32 | RO | 0x6050:07, 1 |
| 1A05:03 | SubIndex 003 | 3. PDO Mapping entry (1 bits align) | UINT32 | RO | 0x0000:00, 8 |
| 1A05:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6050 (AI Inputs Ch.4), entry 0x10 (TxPDO Toggle)) | UINT32 | RO | 0x6050:10, 1 |
| 1A05:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6050 (AI Inputs Ch.4), entry 0x11 (Value)) | UINT32 | RO | 0x6050:11, 16 |

### Index 1A06 AI TxPDO-Map Inputs Ch.5

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A06:0 | AI TxPDO-Map Inputs Ch.5 | PDO Mapping TxPDO 7 | UINT8 | RO | 0x05 ($5_{dec}$) |
| 1A06:01 | SubIndex 001 | 1. PDO Mapping entry (13 bits align) | UINT32 | RO | 0x0000:00, 6 |
| 1A06:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x1C33 (SM input parameter), entry 0x20 (Sync error)) | UINT32 | RO | 0x6060:07, 1 |
| 1A06:03 | SubIndex 003 | 3. PDO Mapping entry (1 bits align) | UINT32 | RO | 0x0000:00, 8 |
| 1A06:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6060 (AI Inputs Ch.5), entry 0x10 (TxPDO Toggle)) | UINT32 | RO | 0x6060:10, 1 |
| 1A06:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6060 (AI Inputs Ch.5), entry 0x11 (Value)) | UINT32 | RO | 0x6060:11, 16 |

### Index 1A07 AI TxPDO-Map Inputs Ch.6

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A07:0 | AI TxPDO-Map Inputs Ch.6 | PDO Mapping TxPDO 8 | UINT8 | RO | 0x05 ($5_{dec}$) |
| 1A07:01 | SubIndex 001 | 1. PDO Mapping entry (13 bits align) | UINT32 | RO | 0x0000:00, 6 |
| 1A07:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x1C33 (SM input parameter), entry 0x20 (Sync error)) | UINT32 | RO | 0x6070:07, 1 |
| 1A07:03 | SubIndex 003 | 3. PDO Mapping entry (1 bits align) | UINT32 | RO | 0x0000:00, 8 |
| 1A07:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6070 (AI Inputs Ch.6), entry 0x10 (TxPDO Toggle)) | UINT32 | RO | 0x6070:10, 1 |
| 1A07:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6070 (AI Inputs Ch.6), entry 0x11 (Value)) | UINT32 | RO | 0x6070:11, 16 |

### Index 1A08 DIG TxPDO-Map Inputs Device

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A08:0 | DIG TxPDO-Map Inputs Device | PDO Mapping TxPDO 9 | UINT8 | RO | 0x04 ($4_{dec}$) |
| 1A08:01 | SubIndex 001 | 1. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x01 (Us Undervoltage)) | UINT32 | RO | 0xF600:01, 1 |
| 1A08:02 | SubIndex 002 | 2. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x02 (Up Undervoltage)) | UINT32 | RO | 0xF600:02, 1 |
| 1A08:03 | SubIndex 003 | 3. PDO Mapping entry (11 bits align) | UINT32 | RO | 0x0000:00, 13 |
| 1A08:04 | SubIndex 004 | 4. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x0E (Sync error)) | UINT32 | RO | 0xF600:10, 1 |

### Index 1C00Sync manager type

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C00:0 | Sync manager type | Using the sync managers | UINT8 | RO | 0x04 ($4_{dec}$) |
| 1C00:01 | SubIndex 001 | Sync-Manager Type Channel 1: Mailbox Write | UINT8 | RO | 0x01 ($1_{dec}$) |
| 1C00:02 | SubIndex 002 | Sync-Manager Type Channel 2: Mailbox Read | UINT8 | RO | 0x02 ($2_{dec}$) |
| 1C00:03 | SubIndex 003 | Sync-Manager Type Channel 3: Process Data Write (Outputs) | UINT8 | RO | 0x03 ($3_{dec}$) |
| 1C00:04 | SubIndex 004 | Sync-Manager Type Channel 4: Process Data Read (Inputs) | UINT8 | RO | 0x04 ($4_{dec}$) |

### Index 1C12 RxPDO assign

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C12:0 | RxPDO assign | PDO Assign Outputs | UINT8 | RO | 0x00 ($0_{dec}$) |

### Index 1C13 TxPDO assign

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C13:0 | TxPDO assign | PDO Assign Inputs | UINT8 | RO | 0x09 ($9_{dec}$) |
| 1C13:01 | Subindex 001 | 1. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A00 ($6656_{dec}$) |
| 1C13:02 | Subindex 002 | 2. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A01 ($6657_{dec}$) |
| 1C13:03 | Subindex 003 | 3. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A02 ($6658_{dec}$) |
| 1C13:04 | Subindex 004 | 4. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A03 ($6659_{dec}$) |
| 1C13:05 | Subindex 005 | 5. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A04 ($6660_{dec}$) |
| 1C13:06 | Subindex 006 | 6. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A05 ($6661_{dec}$) |
| 1C13:07 | Subindex 007 | 7. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A06 ($6662_{dec}$) |
| 1C13:08 | Subindex 008 | 8. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A07 ($6663_{dec}$) |
| 1C13:09 | Subindex 009 | 9. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RO | 0x1A08 ($6664_{dec}$) |

### Index 1C33SM input parameter

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C33:0 | SM input parameter | Synchronization parameters for the inputs | UINT8 | RO | 0x20 ($32_{dec}$) |
| 1C33:01 | Sync mode | Current synchronization mode:<br>• 0: Free Run<br>• 1: Synchronous with SM 3 Event (no outputs available)<br>• 2: DC - Synchron with SYNC0 Event<br>• 3: DC - Synchron with SYNC1 Event<br>• 34: Synchronous with SM 2 Event (outputs available) | UINT16 | RW | 0x0022 ($34_{dec}$) |
| 1C33:02 | Cycle time | as 0x1C32:02 | UINT32 | RW | 0x003D0900 ($4000000_{dec}$) |
| 1C33:03 | Shift time | Time between SYNC0 event and reading of the inputs (in ns, only DC mode) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:04 | Sync modes supported | Supported synchronization modes:<br>• Bit 0: free run is supported<br>• Bit 1: Synchronous with SM 2 Event is supported (outputs available)<br>• Bit 1: Synchronous with SM 3 Event is supported (no outputs available)<br>• Bit 2-3 = 01: DC mode is supported<br>• Bit 4-5 = 01: Input shift through local event (outputs available)<br>• Bit 4-5 = 10: Input shift with SYNC1 event (no outputs available)<br>• Bit 14 = 1: dynamic times (measurement through writing of 0x1C32:08 or 0x1C33:08) | UINT16 | RO | 0xC007 ($49159_{dec}$) |
| 1C33:05 | Minimum cycle time | as 0x1C32:05 | UINT32 | RO | 0x00030D40 ($200000_{dec}$) |
| 1C33:06 | Calc and copy time | Time between reading of the inputs and availability of the inputs for the master (in ns, only DC mode) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:07 | Minimum delay time | | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:08 | Command | as 0x1C32:08 | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C33:09 | Maximum delay time | Time between SYNC1 event and reading of the inputs (in ns, only DC mode) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:0B | SM event missed counter | as 0x1C32:11 | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:0C | Cycle exceeded counter | as 0x1C32:12 | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:0D | Shift too short counter | as 0x1C32:13 | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:20 | Sync error | as 0x1C32:32 | BOOLEAN | RO | 0x00 ($0_{dec}$) |

## 6.4.3 Profile-specific objects (0x6000-0xFFFF)

The profile-specific objects have the same meaning for all EtherCAT slaves that support the profile 5001.

### Index 6000 DIG Inputs Ch.1

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6000:0 | DIG Inputs Ch.1 | | UINT8 | RO | 0x08 ($8_{dec}$) |
| 6000:01 | Input 1 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6000:02 | Input 2 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6000:03 | Input 3 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6000:04 | Input 4 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6000:05 | Input 5 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6000:06 | Input 6 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6000:07 | Input 7 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6000:08 | Input 8 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

### Index 6010 DIG Inputs Ch.2

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6010:0 | DIG Inputs Ch.2 | | UINT8 | RO | 0x08 ($8_{dec}$) |
| 6010:01 | Input 1 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6010:02 | Input 2 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6010:03 | Input 3 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6010:04 | Input 4 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6010:05 | Input 5 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6010:06 | Input 6 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6010:07 | Input 7 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6010:08 | Input 8 | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

### Index 6020 AI Inputs Ch.1

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6020:0 | AI Inputs Ch.1 | | UINT8 | RO | 0x11 ($17_{dec}$) |
| 6020:07 | Error | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6020:10 | TxPDO Toggle | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6020:11 | Value | | INT16 | RO | 0x0000 ($0_{dec}$) |

### Index 6030 AI Inputs Ch.2

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6030:0 | AI Inputs Ch.2 | | UINT8 | RO | 0x11 ($17_{dec}$) |
| 6030:07 | Error | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6030:10 | TxPDO Toggle | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6030:11 | Value | | INT16 | RO | 0x0000 ($0_{dec}$) |

### Index 6040 AI Inputs Ch.3

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6040:0 | AI Inputs Ch.3 | | UINT8 | RO | 0x11 ($17_{dec}$) |
| 6040:07 | Error | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6040:10 | TxPDO Toggle | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6040:11 | Value | | INT16 | RO | 0x0000 ($0_{dec}$) |

### Index 6050 AI Inputs Ch.4

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6050:0 | AI Inputs Ch.4 | | UINT8 | RO | 0x11 ($17_{dec}$) |
| 6050:07 | Error | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6050:10 | TxPDO Toggle | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6050:11 | Value | | INT16 | RO | 0x0000 ($0_{dec}$) |

### Index 6060 AI Inputs Ch.5

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6060:0 | AI Inputs Ch.5 | | UINT8 | RO | 0x11 ($17_{dec}$) |
| 6060:07 | Error | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6060:10 | TxPDO Toggle | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6060:11 | Value | | INT16 | RO | 0x0000 ($0_{dec}$) |

### Index 6070 AI Inputs Ch.6

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6070:0 | AI Inputs Ch.6 | | UINT8 | RO | 0x11 ($17_{dec}$) |
| 6070:07 | Error | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6070:10 | TxPDO Toggle | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6070:11 | Value | | INT16 | RO | 0x0000 ($0_{dec}$) |

### Index F000 Modular device profile

| Index (hex) | Maximum number of modules>Name | Meaning | UINT16>Data type | RO>Flags | 0x0009 ($9_{dec}$)>Default |
|---|---|---|---|---|---|
| F000:0 | Modular device profile | General information for the modular device profile | UINT8 | RO | 0x02 ($2_{dec}$) |
| F000:01 | Module index distance | | UINT16 | RO | 0x0010 ($16_{dec}$) |
| F000:02 | Maximum number of modules | | UINT16 | RO | 0x0009 ($9_{dec}$) |

### Index F008 Code word

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F008:0 | Code word | | UINT32 | RW | 0x00000000 ($0_{dec}$) |

### Index F010 Module list

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F010:0 | Module list | | UINT8 | RW | 0x09 ($9_{dec}$) |
| F010:01 | SubIndex 001 | | UINT32 | RW | 0x00000118 ($280_{dec}$) |
| F010:02 | SubIndex 002 | | UINT32 | RW | 0x00000118 ($280_{dec}$) |
| F010:03 | SubIndex 003 | | UINT32 | RW | 0x0000012C ($300_{dec}$) |
| F010:04 | SubIndex 004 | | UINT32 | RW | 0x0000012C ($300_{dec}$) |
| F010:05 | SubIndex 005 | | UINT32 | RW | 0x0000012C ($300_{dec}$) |
| F010:06 | SubIndex 006 | | UINT32 | RW | 0x0000012C ($300_{dec}$) |
| F010:07 | SubIndex 007 | | UINT32 | RW | 0x0000012C ($300_{dec}$) |
| F010:08 | SubIndex 008 | | UINT32 | RW | 0x0000012C ($300_{dec}$) |
| F010:09 | SubIndex 009 | | UINT32 | RW | 0x00000168 ($360_{dec}$) |

### Index F600 DIG Inputs

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F600:0 | DIG Inputs | | UINT8 | RO | 0x10 ($16_{dec}$) |
| F600:01 | Us Undervoltage | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| F600:02 | Up Undervoltage | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| F600:10 | TxPDO Toggle | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

## 6.5 EP1839-0042 - Object overview

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| 1000 [▶ 163] | | Device type | RO | 0x00001389 (5001$_{dec}$) |
| 1008 [▶ 163] | | Device name | RO | EP1839-0042 |
| 1009 [▶ 163] | | Hardware version | RO | |
| 100A [▶ 163] | | Software version | RO | 02 |
| 100B [▶ 163] | | Bootloader version | RO | N/A |
| 1011:0 [▶ 163] | SubIndex | Restore default parameters | RO | 0x01 (1$_{dec}$) |
| | 1011:01 | SubIndex 001 | RW | 0x00000000 (0$_{dec}$) |
| 1018:0 [▶ 163] | SubIndex | Identity | RO | 0x04 (4$_{dec}$) |
| | 1018:01 | Vendor ID | RO | 0x00000002 (2$_{dec}$) |
| | 1018:02 | Product code | RO | 0x072F4052 (120537170$_{dec}$) |
| | 1018:03 | Revision | RO | 0x00000000 (0$_{dec}$) |
| | 1018:04 | Serial number | RO | 0x00000000 (0$_{dec}$) |
| 10E2:0 [▶ 164] | SubIndex | Manufacturer-specific Identification Code | RO | 0x01 (1$_{dec}$) |
| | 10E2:01 | SubIndex 001 | RO | |
| 10F0:0 [▶ 164] | SubIndex | Backup parameter handling | RO | 0x01 (1$_{dec}$) |
| | 10F00:01 | Checksum | RO | 0x00000000 (0$_{dec}$) |
| 10F3:0 [▶ 164] | SubIndex | Diagnosis History | RO | 0x15 (21$_{dec}$) |
| | 10F3:01 | Maximum Messages | RO | 0x00 (0$_{dec}$) |
| | 10F3:02 | Newest Message | RO | 0x00 (0$_{dec}$) |
| | 10F3:03 | Newest Acknowledged Message | RW | 0x00 (0$_{dec}$) |
| | 10F3:04 | New Messages Available | RO | 0x00 (0$_{dec}$) |
| | 10F3:05 | Flags | RW | 0x0000 (0$_{dec}$) |
| | 10F3:06 | Diagnosis Message 001 | RO | {0} |
| | 10F3:07 | Diagnosis Message 002 | RO | {0} |
| | 10F3:08 | Diagnosis Message 003 | RO | {0} |
| | 10F3:09 | Diagnosis Message 004 | RO | {0} |
| | 10F3:0A | Diagnosis Message 005 | RO | {0} |
| | 10F3:0B | Diagnosis Message 006 | RO | {0} |
| | 10F3:0C | Diagnosis Message 007 | RO | {0} |
| | 10F3:0D | Diagnosis Message 008 | RO | {0} |
| | 10F3:0E | Diagnosis Message 009 | RO | {0} |
| | 10F3:0F | Diagnosis Message 010 | RO | {0} |
| | 10F3:10 | Diagnosis Message 011 | RO | {0} |
| | 10F3:11 | Diagnosis Message 012 | RO | {0} |
| | 10F3:12 | Diagnosis Message 013 | RO | {0} |
| | 10F3:13 | Diagnosis Message 014 | RO | {0} |
| | 10F3:14 | Diagnosis Message 015 | RO | {0} |
| | 10F3:15 | Diagnosis Message 016 | RO | {0} |
| 10F8 [▶ 164] | | Timestamp Object | RO | |
| 10F9:0 [▶ 164] | SubIndex | Time Distribution Object | RO | 0x01 (1$_{dec}$) |
| | 10F9:01 | Distributed Time Value | RW | |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| 1602:0 [▶ 164] | SubIndex | DO RxPDO-Map Output | RO | 0x08 ($8_{dec}$) |
| | 1602:01 | SubIndex 001 | RO | 0x7100:01, 1 |
| | 1602:02 | SubIndex 002 | RO | 0x7110:01, 1 |
| | 1602:03 | SubIndex 003 | RO | 0x7120:01, 1 |
| | 1602:04 | SubIndex 004 | RO | 0x7130:01, 1 |
| | 1602:05 | SubIndex 005 | RO | 0x7140:01, 1 |
| | 1602:06 | SubIndex 006 | RO | 0x7150:01, 1 |
| | 1602:07 | SubIndex 007 | RO | 0x7160:01, 1 |
| | 1602:08 | SubIndex 008 | RO | 0x7170:01, 1 |
| 1A00:0 [▶ 165] | SubIndex | DI TxPDO-Map Input | RO | 0x10 ($16_{dec}$) |
| | 1A00:01 | SubIndex 001 | RO | 0x6000:01, 1 |
| | 1A00:02 | SubIndex 002 | RO | 0x6010:01, 1 |
| | 1A00:03 | SubIndex 003 | RO | 0x6020:01, 1 |
| | 1A00:04 | SubIndex 004 | RO | 0x6030:01, 1 |
| | 1A00:05 | SubIndex 005 | RO | 0x6040:01, 1 |
| | 1A00:06 | SubIndex 006 | RO | 0x6050:01, 1 |
| | 1A00:07 | SubIndex 007 | RO | 0x6060:01, 1 |
| | 1A00:08 | SubIndex 008 | RO | 0x6070:01, 1 |
| | 1A00:09 | SubIndex 009 | RO | 0x6080:01, 1 |
| | 1A00:0A | SubIndex 010 | RO | 0x6090:01, 1 |
| | 1A00:0B | SubIndex 011 | RO | 0x60A00:01, 1 |
| | 1A00:0C | SubIndex 012 | RO | 0x60B00:01, 1 |
| | 1A00:0D | SubIndex 013 | RO | 0x60C00:01, 1 |
| | 1A00:0E | SubIndex 014 | RO | 0x60D00:01, 1 |
| | 1A00:0F | SubIndex 015 | RO | 0x60E00:01, 1 |
| | 1A00:10 | SubIndex 016 | RO | 0x60F00:01, 1 |
| 1A01 [▶ 166]:0 | SubIndex | DI TxPDO-Map Diagnosis | RO | 0x10 ($16_{dec}$) |
| | 1A01:01 | SubIndex 001 | RO | 0x6001:01, 1 |
| | 1A01:02 | SubIndex 002 | RO | 0x6011:01, 1 |
| | 1A01:03 | SubIndex 003 | RO | 0x6021:01, 1 |
| | 1A01:04 | SubIndex 004 | RO | 0x6031:01, 1 |
| | 1A01:05 | SubIndex 005 | RO | 0x6041:01, 1 |
| | 1A01:06 | SubIndex 006 | RO | 0x6051:01, 1 |
| | 1A01:07 | SubIndex 007 | RO | 0x6061:01, 1 |
| | 1A01:08 | SubIndex 008 | RO | 0x6071:01, 1 |
| | 1A01:09 | SubIndex 009 | RO | 0x6081:01, 1 |
| | 1A01:0A | SubIndex 010 | RO | 0x6091:01, 1 |
| | 1A01:0B | SubIndex 011 | RO | 0x60A1:01, 1 |
| | 1A01:0C | SubIndex 012 | RO | 0x60B1:01, 1 |
| | 1A01:0D | SubIndex 013 | RO | 0x60C1:01, 1 |
| | 1A01:0E | SubIndex 014 | RO | 0x60D1:01, 1 |
| | 1A01:0F | SubIndex 015 | RO | 0x60E1:01, 1 |
| | 1A01:10 | SubIndex 016 | RO | 0x60F1:01, 1 |
| 1A02:0 [▶ 167] | SubIndex | DO TxPDO-Map Diagnosis | RO | 0x20 ($32_{dec}$) |
| | 1A02:01 | SubIndex 001 | RO | 0x6102:01, 1 |
| | 1A02:02 | SubIndex 002 | RO | 0x6102:02, 1 |
| | 1A02:03 | SubIndex 003 | RO | 0x6102:03, 1 |
| | 1A02:04 | SubIndex 004 | RO | 0x6102:04, 1 |
| | 1A02:05 | SubIndex 005 | RO | 0x6112:01, 1 |
| | 1A02:06 | SubIndex 006 | RO | 0x6112:02, 1 |
| | 1A02:07 | SubIndex 007 | RO | 0x6112:03, 1 |
| | 1A02:08 | SubIndex 008 | RO | 0x6112:04, 1 |
| | 1A02:09 | SubIndex 009 | RO | 0x6122:01, 1 |
| | 1A02:0A | SubIndex 010 | RO | 0x6122:02, 1 |
| | 1A02:0B | SubIndex 011 | RO | 0x6122:03, 1 |
| | 1A02:0C | SubIndex 012 | RO | 0x6122:04, 1 |
| | 1A02:0D | SubIndex 013 | RO | 0x6132:01, 1 |
| | 1A02:0E | SubIndex 014 | RO | 0x6132:02, 1 |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| | 1A02:0F | SubIndex 015 | RO | 0x6132:03, 1 |
| | 1A02:10 | SubIndex 016 | RO | 0x6132:04, 1 |
| | 1A02:11 | SubIndex 017 | RO | 0x6142:01, 1 |
| | 1A02:12 | SubIndex 018 | RO | 0x6142:02, 1 |
| | 1A02:13 | SubIndex 019 | RO | 0x6142:03, 1 |
| | 1A02:14 | SubIndex 020 | RO | 0x6142:04, 1 |
| | 1A02:15 | SubIndex 021 | RO | 0x6152:01, 1 |
| | 1A02:16 | SubIndex 022 | RO | 0x6152:02, 1 |
| | 1A02:17 | SubIndex 023 | RO | 0x6152:03, 1 |
| | 1A02:18 | SubIndex 024 | RO | 0x6152:04, 1 |
| | 1A02:19 | SubIndex 025 | RO | 0x6162:01, 1 |
| | 1A02:1A | SubIndex 026 | RO | 0x6162:02, 1 |
| | 1A02:1B | SubIndex 027 | RO | 0x6162:03, 1 |
| | 1A02:1C | SubIndex 028 | RO | 0x6162:04, 1 |
| | 1A02:1D | SubIndex 029 | RO | 0x6172:01, 1 |
| | 1A02:1E | SubIndex 030 | RO | 0x6172:02, 1 |
| | 1A02:1F | SubIndex 031 | RO | 0x6172:03, 1 |
| | 1A02:20 | SubIndex 032 | RO | 0x6172:04, 1 |
| 1A03:0 [▶ 168] | SubIndex | DEV TxPDO-Map Inputs Device | RO | 0x07 ($7_{dec}$) |
| | 1A03:01 | SubIndex 001 | RO | 0xF600:01, 1 |
| | 1A03:02 | SubIndex 002 | RO | 0x0000:00, 1 |
| | 1A03:03 | SubIndex 003 | RO | 0xF600:03, 1 |
| | 1A03:04 | SubIndex 004 | RO | 0x0000:00, 9 |
| | 1A03:05 | SubIndex 005 | RO | 0xF600:0D, 1 |
| | 1A03:06 | SubIndex 006 | RO | 0xF600:0E, 1 |
| | 1A03:07 | SubIndex 007 | RO | 0xF600:0F, 2 |
| 1C00:0 [▶ 168] | SubIndex | Sync manager type | RO | 0x04 ($4_{dec}$) |
| | 1C00:01 | SubIndex 001 | RO | 0x01 ($1_{dec}$) |
| | 1C00:02 | SubIndex 002 | RO | 0x02 ($2_{dec}$) |
| | 1C00:03 | SubIndex 003 | RO | 0x03 ($3_{dec}$) |
| | 1C00:04 | SubIndex 004 | RO | 0x04 ($4_{dec}$) |
| 1C12:0 [▶ 168] | SubIndex | RxPDO assign | RW | 0x01 ($1_{dec}$) |
| | 1C12:01 | SubIndex 001 | RW | 0x1602 ($5634_{dec}$) |
| | 1C12:02 | SubIndex 002 | RW | 0x0000 ($0_{dec}$) |
| | 1C12:03 | SubIndex 003 | RW | 0x0000 ($0_{dec}$) |
| | 1C12:04 | SubIndex 004 | RW | 0x0000 ($0_{dec}$) |
| | 1C12:05 | SubIndex 005 | RW | 0x0000 ($0_{dec}$) |
| | 1C12:06 | SubIndex 006 | RW | 0x0000 ($0_{dec}$) |
| | 1C12:07 | SubIndex 007 | RW | 0x0000 ($0_{dec}$) |
| | 1C12:08 | SubIndex 008 | RW | 0x0000 ($0_{dec}$) |
| 1C13:0 [▶ 169] | SubIndex | TxPDO assign | RW | 0x04 ($4_{dec}$) |
| | 1C13:01 | SubIndex 001 | RW | 0x1A00 ($6656_{dec}$) |
| | 1C13:02 | SubIndex 002 | RW | 0x1A01 ($6657_{dec}$) |
| | 1C13:03 | SubIndex 003 | RW | 0x1A02 ($6658_{dec}$) |
| | 1C13:04 | SubIndex 004 | RW | 0x1A03 ($6659_{dec}$) |
| | 1C13:05 | SubIndex 005 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:06 | SubIndex 006 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:07 | SubIndex 007 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:08 | SubIndex 008 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:09 | SubIndex 009 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:0A | SubIndex 010 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:0B | SubIndex 011 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:0C | SubIndex 012 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:0D | SubIndex 013 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:0E | SubIndex 014 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:0F | SubIndex 015 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:10 | SubIndex 016 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:11 | SubIndex 017 | RW | 0x0000 ($0_{dec}$) |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| | 1C13:12 | SubIndex 018 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:13 | SubIndex 019 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:14 | SubIndex 020 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:15 | SubIndex 021 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:16 | SubIndex 022 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:17 | SubIndex 023 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:18 | SubIndex 024 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:19 | SubIndex 025 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:1A | SubIndex 026 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:1B | SubIndex 027 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:1C | SubIndex 028 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:1D | SubIndex 029 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:1E | SubIndex 030 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:1F | SubIndex 031 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:20 | SubIndex 032 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:21 | SubIndex 033 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:22 | SubIndex 034 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:23 | SubIndex 035 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:24 | SubIndex 036 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:25 | SubIndex 037 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:26 | SubIndex 038 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:27 | SubIndex 039 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:28 | SubIndex 040 | RW | 0x0000 ($0_{dec}$) |
| | 1C13:29 | SubIndex 041 | RW | 0x0000 ($0_{dec}$) |
| 1C32:0 [▶ 171] | SubIndex | SM output parameter | RO | 0x20 ($32_{dec}$) |
| | 1C32:01 | Sync mode | RW | 0x0001 ($1_{dec}$) |
| | 1C32:02 | Cycle time | RW | 0x000F4240 ($1000000_{dec}$) |
| | 1C32:03 | Shift time | RO | 0x00000000 ($0_{dec}$) |
| | 1C32:04 | Sync modes supported | RO | 0x440B ($17419_{dec}$) |
| | 1C32:05 | Minimum cycle time | RO | 0x000249F0 ($150000_{dec}$) |
| | 1C32:06 | Calc and copy time | RO | 0x00000000 ($0_{dec}$) |
| | 1C32:07 | Minimum delay time | RO | 0x00000000 ($0_{dec}$) |
| | 1C32:08 | Get Cycle Time | RW | 0x0000 ($0_{dec}$) |
| | 1C32:09 | Maximum delay time | RO | 0x00000000 ($0_{dec}$) |
| | 1C32:0B | SM event missed counter | RO | 0x0000 ($0_{dec}$) |
| | 1C32:0C | Cycle exceeded counter | RO | 0x0000 ($0_{dec}$) |
| | 1C32:0D | Shift too short counter | RO | 0x0000 ($0_{dec}$) |
| | 1C32:20 | Sync error | RO | 0x00 ($0_{dec}$) |
| 1C33:0 [▶ 172] | SubIndex | SM input parameter | RO | 0x20 ($32_{dec}$) |
| | 1C33:01 | Sync mode | RW | 0x0022 ($34_{dec}$) |
| | 1C33:02 | Cycle time | RW | 0x000F4240 ($1000000_{dec}$) |
| | 1C33:03 | Shift time | RO | 0x000249F0 ($150000_{dec}$) |
| | 1C33:04 | Sync modes supported | RO | 0x440B ($17419_{dec}$) |
| | 1C33:05 | Minimum cycle time | RO | 0x000249F0 ($150000_{dec}$) |
| | 1C33:06 | Calc and copy time | RO | 0x00000000 ($0_{dec}$) |
| | 1C33:07 | Minimum delay time | RO | 0x00000000 ($0_{dec}$) |
| | 1C33:08 | Get Cycle Time | RW | 0x0000 ($0_{dec}$) |
| | 1C33:09 | Maximum delay time | RO | 0x00000000 ($0_{dec}$) |
| | 1C33:0B | SM event missed counter | RO | 0x0000 ($0_{dec}$) |
| | 1C33:0C | Cycle exceeded counter | RO | 0x0000 ($0_{dec}$) |
| | 1C33:0D | Shift too short counter | RO | 0x0000 ($0_{dec}$) |
| | 1C33:20 | Sync error | RO | 0x00 ($0_{dec}$) |
| 6000:0 [▶ 173] | SubIndex | DI Input Ch.01 | RO | 0x01 ($1_{dec}$) |
| | 6000:01♠ | Input | RO | 0x00 ($0_{dec}$) |
| 6001:0 [▶ 173] | SubIndex | DI Diagnosis Ch.01 | RO | 0x01 ($1_{dec}$) |
| | 6001:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6010:0 [▶ 173] | SubIndex | DI Input Ch.02 | RO | 0x01 ($1_{dec}$) |
| | 6010:01 | Input | RO | 0x00 ($0_{dec}$) |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| 6011:0 [▶ 173] | SubIndex | DI Diagnosis Ch.02 | RO | 0x01 ($1_{dec}$) |
| | 6011:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6020:0 [▶ 173] | SubIndex | DI Input Ch.03 | RO | 0x01 ($1_{dec}$) |
| | 6020:01 | Input | RO | 0x00 ($0_{dec}$) |
| 6021:0 [▶ 173] | SubIndex | DI Diagnosis Ch.03 | RO | 0x01 ($1_{dec}$) |
| | 6021:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6030:0 [▶ 173] | SubIndex | DI Input Ch.04 | RO | 0x01 ($1_{dec}$) |
| | 6030:01 | Input | RO | 0x00 ($0_{dec}$) |
| 6031:0 [▶ 173] | SubIndex | DI Diagnosis Ch.04 | RO | 0x01 ($1_{dec}$) |
| | 6031:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6040:0 [▶ 173] | SubIndex | DI Input Ch.05 | RO | 0x01 ($1_{dec}$) |
| | 6040:01 | Input | RO | 0x00 ($0_{dec}$) |
| 6041:0 [▶ 173] | SubIndex | DI Diagnosis Ch.05 | RO | 0x01 ($1_{dec}$) |
| | 6041:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6050:0 [▶ 173] | SubIndex | DI Input Ch.06 | RO | 0x01 ($1_{dec}$) |
| | 6050:01 | Input | RO | 0x00 ($0_{dec}$) |
| 6051:0 [▶ 173] | SubIndex | DI Diagnosis Ch.06 | RO | 0x01 ($1_{dec}$) |
| | 6051:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6060:0 [▶ 174] | SubIndex | DI Input Ch.07 | RO | 0x01 ($1_{dec}$) |
| | 6060:01 | Input | RO | 0x00 ($0_{dec}$) |
| 6061:0 [▶ 174] | SubIndex | DI Diagnosis Ch.07 | RO | 0x01 ($1_{dec}$) |
| | 6061:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6070:0 [▶ 174] | SubIndex | DI Input Ch.08 | RO | 0x01 ($1_{dec}$) |
| | 6070:01 | Input | RO | 0x00 ($0_{dec}$) |
| 6071:0 [▶ 174] | SubIndex | DI Diagnosis Ch.08 | RO | 0x01 ($1_{dec}$) |
| | 6071:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6080:0 [▶ 174] | SubIndex | DI Input Ch.09 | RO | 0x01 ($1_{dec}$) |
| | 6080:01 | Input | RO | 0x00 ($0_{dec}$) |
| 6081:0 [▶ 174] | SubIndex | DI Diagnosis Ch.09 | RO | 0x01 ($1_{dec}$) |
| | 6081:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 6090:0 [▶ 174] | SubIndex | DI Input Ch.10 | RO | 0x01 ($1_{dec}$) |
| | 6090:01 | Input | RO | 0x00 ($0_{dec}$) |
| 6091:0 [▶ 174] | SubIndex | DI Diagnosis Ch.10 | RO | 0x01 ($1_{dec}$) |
| | 6091:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 60A0:0 [▶ 174] | SubIndex | DI Input Ch.11 | RO | 0x01 ($1_{dec}$) |
| | 60A00:01 | Input | RO | 0x00 ($0_{dec}$) |
| 60A1:0 [▶ 174] | SubIndex | DI Diagnosis Ch.11 | RO | 0x01 ($1_{dec}$) |
| | 60A1:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 60B0:0 [▶ 174] | SubIndex | DI Input Ch.12 | RO | 0x01 ($1_{dec}$) |
| | 60B00:01 | Input | RO | 0x00 ($0_{dec}$) |
| 60B1:0 [▶ 174] | SubIndex | DI Diagnosis Ch.12 | RO | 0x01 ($1_{dec}$) |
| | 60B1:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 60C0:0 [▶ 174] | SubIndex | DI Input Ch.13 | RO | 0x01 ($1_{dec}$) |
| | 60C00:01 | Input | RO | 0x00 ($0_{dec}$) |
| 60C1 [▶ 175]:0 | SubIndex | DI Diagnosis Ch.13 | RO | 0x01 ($1_{dec}$) |
| | 60C1:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 60D0:0 [▶ 175] | SubIndex | DI Input Ch.14 | RO | 0x01 ($1_{dec}$) |
| | 60D00:01 | Input | RO | 0x00 ($0_{dec}$) |
| 60D1:0 [▶ 175] | SubIndex | DI Diagnosis Ch.14 | RO | 0x01 ($1_{dec}$) |
| | 60D1:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 60E0 [▶ 175]:0 | SubIndex | DI Input Ch.15 | RO | 0x01 ($1_{dec}$) |
| | 60E00:01 | Input | RO | 0x00 ($0_{dec}$) |
| 60E1 [▶ 175]:0 | SubIndex | DI Diagnosis Ch.15 | RO | 0x01 ($1_{dec}$) |
| | 60E1:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |
| 60F0 [▶ 175]:0 | SubIndex | DI Input Ch.16 | RO | 0x01 ($1_{dec}$) |
| | 60F00:01 | Input | RO | 0x00 ($0_{dec}$) |
| 60F1 [▶ 175]:0 | SubIndex | DI Diagnosis Ch.16 | RO | 0x01 ($1_{dec}$) |
| | 60F1:01 | Wirebreak | RO | 0x00 ($0_{dec}$) |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| 6102 [▶ 175]:0 | SubIndex | DO Diagnosis Ch.01 | RO | 0x04 ($4_{dec}$) |
| | 6102:01 | Overcurrent | RO | 0x00 ($0_{dec}$) |
| | 6102:02 | Overload | RO | 0x00 ($0_{dec}$) |
| | 6102:03 | Open load | RO | 0x00 ($0_{dec}$) |
| | 6102:04 | Short to 24V | RO | 0x00 ($0_{dec}$) |
| 6112 [▶ 175]:0 | SubIndex | DO Diagnosis Ch.02 | RO | 0x04 ($4_{dec}$) |
| | 6112:01 | Overcurrent | RO | 0x00 ($0_{dec}$) |
| | 6112:02 | Overload | RO | 0x00 ($0_{dec}$) |
| | 6112:03 | Open load | RO | 0x00 ($0_{dec}$) |
| | 6112:04 | Short to 24V | RO | 0x00 ($0_{dec}$) |
| 6122 [▶ 175]:0 | SubIndex | DO Diagnosis Ch.03 | RO | 0x04 ($4_{dec}$) |
| | 6122:01 | Overcurrent | RO | 0x00 ($0_{dec}$) |
| | 6122:02 | Overload | RO | 0x00 ($0_{dec}$) |
| | 6122:03 | Open load | RO | 0x00 ($0_{dec}$) |
| | 6122:04 | Short to 24V | RO | 0x00 ($0_{dec}$) |
| 6132 [▶ 176]:0 | SubIndex | DO Diagnosis Ch.04 | RO | 0x04 ($4_{dec}$) |
| | 6132:01 | Overcurrent | RO | 0x00 ($0_{dec}$) |
| | 6132:02 | Overload | RO | 0x00 ($0_{dec}$) |
| | 6132:03 | Open load | RO | 0x00 ($0_{dec}$) |
| | 6132:04 | Short to 24V | RO | 0x00 ($0_{dec}$) |
| 6142 [▶ 176]:0 | SubIndex | DO Diagnosis Ch.05 | RO | 0x04 ($4_{dec}$) |
| | 6142:01 | Overcurrent | RO | 0x00 ($0_{dec}$) |
| | 6142:02 | Overload | RO | 0x00 ($0_{dec}$) |
| | 6142:03 | Open load | RO | 0x00 ($0_{dec}$) |
| | 6142:04 | Short to 24V | RO | 0x00 ($0_{dec}$) |
| 6152 [▶ 176]:0 | SubIndex | DO Diagnosis Ch.06 | RO | 0x04 ($4_{dec}$) |
| | 6152:01 | Overcurrent | RO | 0x00 ($0_{dec}$) |
| | 6152:02 | Overload | RO | 0x00 ($0_{dec}$) |
| | 6152:03 | Open load | RO | 0x00 ($0_{dec}$) |
| | 6152:04 | Short to 24V | RO | 0x00 ($0_{dec}$) |
| 6162 [▶ 176]:0 | SubIndex | DO Diagnosis Ch.07 | RO | 0x04 ($4_{dec}$) |
| | 6162:01 | Overcurrent | RO | 0x00 ($0_{dec}$) |
| | 6162:02 | Overload | RO | 0x00 ($0_{dec}$) |
| | 6162:03 | Open load | RO | 0x00 ($0_{dec}$) |
| | 6162:04 | Short to 24V | RO | 0x00 ($0_{dec}$) |
| 6172 [▶ 176]:0 | SubIndex | DO Diagnosis Ch.08 | RO | 0x04 ($4_{dec}$) |
| | 6172:01 | Overcurrent | RO | 0x00 ($0_{dec}$) |
| | 6172:02 | Overload | RO | 0x00 ($0_{dec}$) |
| | 6172:03 | Open load | RO | 0x00 ($0_{dec}$) |
| | 6172:04 | Short to 24V | RO | 0x00 ($0_{dec}$) |
| 7100 [▶ 176]:0 | SubIndex | DO Output Ch.01 | RO | 0x01 ($1_{dec}$) |
| | 7100:01 | Output | RO | 0x00 ($0_{dec}$) |
| 7110 [▶ 176]:0 | SubIndex | DO Output Ch.02 | RO | 0x01 ($1_{dec}$) |
| | 7110:01 | Output | RO | 0x00 ($0_{dec}$) |
| 7120 [▶ 176]:0 | SubIndex | DO Output Ch.03 | RO | 0x01 ($1_{dec}$) |
| | 7120:01 | Output | RO | 0x00 ($0_{dec}$) |
| 7130 [▶ 176]:0 | SubIndex | DO Output Ch.04 | RO | 0x01 ($1_{dec}$) |
| | 7130:01 | Output | RO | 0x00 ($0_{dec}$) |
| 7140 [▶ 177]:0 | SubIndex | DO Output Ch.05 | RO | 0x01 ($1_{dec}$) |
| | 7140:01 | Output | RO | 0x00 ($0_{dec}$) |
| 7150 [▶ 177]:0 | SubIndex | DO Output Ch.06 | RO | 0x01 ($1_{dec}$) |
| | 7150:01 | Output | RO | 0x00 ($0_{dec}$) |
| 7160 [▶ 177]:0 | SubIndex | DO Output Ch.07 | RO | 0x01 ($1_{dec}$) |
| | 7160:01 | Output | RO | 0x00 ($0_{dec}$) |
| 7170 [▶ 177]:0 | SubIndex | DO Output Ch.08 | RO | 0x01 ($1_{dec}$) |
| | 7170:01 | Output | RO | 0x00 ($0_{dec}$) |
| 8000:0 [▶ 177] | SubIndex | DI Settings Ch.01 | RW | 0x12 ($18_{dec}$) |
| | 8000:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| | 8000:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8000:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8010:0 [▶ 177] | SubIndex | DI Settings Ch.02 | RW | 0x12 ($18_{dec}$) |
| | 8010:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8010:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8010:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8020:0 [▶ 177] | SubIndex | DI Settings Ch.03 | RW | 0x12 ($18_{dec}$) |
| | 8020:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8020:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8020:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8030:0 [▶ 178] | SubIndex | DI Settings Ch.04 | RW | 0x12 ($18_{dec}$) |
| | 8030:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8030:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8030:12 | Signal extension time | RW | 0x0000 ($_{0dec}$) |
| 8040:0 [▶ 178] | SubIndex | DI Settings Ch.05 | RW | 0x12 ($18_{dec}$) |
| | 8040:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8040:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8040:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8050:0 [▶ 178] | SubIndex | DI Settings Ch.06 | RW | 0x12 ($18_{dec}$) |
| | 8050:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8050:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8050:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8060:0 [▶ 178] | SubIndex | DI Settings Ch.07 | RW | 0x12 ($18_{dec}$) |
| | 8060:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8060:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8060:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8070:0 [▶ 178] | SubIndex | DI Settings Ch.08 | RW | 0x12 ($18_{dec}$) |
| | 8070:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8070:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8070:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8080:0 [▶ 179] | SubIndex | DI Settings Ch.09 | RW | 0x12 ($18_{dec}$) |
| | 8080:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8080:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8080:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8090:0 [▶ 179] | SubIndex | DI Settings Ch.10 | RW | 0x12 ($18_{dec}$) |
| | 8090:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 8090:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 8090:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 80A0:0 [▶ 179] | SubIndex | DI Settings Ch.11 | RW | 0x12 ($18_{dec}$) |
| | 80A00:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 80A00:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 80A00:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 80B0:0 [▶ 179] | SubIndex | DI Settings Ch.12 | RW | 0x12 ($18_{dec}$) |
| | 80B00:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 80B00:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 80B00:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 80C0:0 [▶ 179] | SubIndex | DI Settings Ch.13 | RW | 0x12 ($18_{dec}$) |
| | 80C00:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 80C00:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 80C00:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 80D0:0 [▶ 180] | SubIndex | DI Settings Ch.14 | RW | 0x12 ($18_{dec}$) |
| | 80D00:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 80D00:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 80D00:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 80E0:0 [▶ 180] | SubIndex | DI Settings Ch.15 | RW | 0x12 ($18_{dec}$) |
| | 80E00:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 80E00:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 80E00:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| 80F0:0 [▶ 180] | SubIndex | DI Settings Ch.16 | RW | 0x12 ($18_{dec}$) |
| | 80F00:01 | Enable open load detection | RW | 0x00 ($0_{dec}$) |
| | 80F00:11 | Filter time | RW | 0x0000 ($0_{dec}$) |
| | 80F00:12 | Signal extension time | RW | 0x0000 ($0_{dec}$) |
| 8100:0 [▶ 180] | SubIndex | DO Settings Ch.01 | RW | 0x06 ($6_{dec}$) |
| | 8100:01 | Detect openload in off state | RW | 0x00 ($0_{dec}$) |
| | 8100:02 | Detect openload in on state | RW | 0x00 ($0_{dec}$) |
| | 8100:03 | Detect short to 24V | RW | 0x00 ($0_{dec}$) |
| | 8100:04 | Safe state active | RW | 0x01 ($1_{dec}$) |
| | 8100:05 | Safe state value | RW | 0x00 ($0_{dec}$) |
| | 8100:06 | Use output as power supply | RW | 0x01 ($1_{dec}$) |
| 8110:0 [▶ 181] | SubIndex | DO Settings Ch.02 | RW | 0x06 ($6_{dec}$) |
| | 8110:01 | Detect openload in off state | RW | 0x00 ($0_{dec}$) |
| | 8110:02 | Detect openload in on state | RW | 0x00 ($0_{dec}$) |
| | 8110:03 | Detect short to 24V | RW | 0x00 ($0_{dec}$) |
| | 8110:04 | Safe state active | RW | 0x01 ($1_{dec}$) |
| | 8110:05 | Safe state value | RW | 0x00 ($0_{dec}$) |
| | 8110:06 | Use output as power supply | RW | 0x01 ($1_{dec}$) |
| 8120:0 [▶ 181] | SubIndex | DO Settings Ch.03 | RW | 0x06 ($6_{dec}$) |
| | 8120:01 | Detect openload in off state | RW | 0x00 ($0_{dec}$) |
| | 8120:02 | Detect openload in on state | RW | 0x00 ($0_{dec}$) |
| | 8120:03 | Detect short to 24V | RW | 0x00 ($0_{dec}$) |
| | 8120:04 | Safe state active | RW | 0x01 ($1_{dec}$) |
| | 8120:05 | Safe state value | RW | 0x00 ($0_{dec}$) |
| | 8120:06 | Use output as power supply | RW | 0x01 ($1_{dec}$) |
| 8130:0 [▶ 182] | SubIndex | DO Settings Ch.04 | RW | 0x06 ($6_{dec}$) |
| | 8130:01 | Detect openload in off state | RW | 0x00 ($0_{dec}$) |
| | 8130:02 | Detect openload in on state | RW | 0x00 ($0_{dec}$) |
| | 8130:03 | Detect short to 24V | RW | 0x00 ($0_{dec}$) |
| | 8130:04 | Safe state active | RW | 0x01 ($1_{dec}$) |
| | 8130:05 | Safe state value | RW | 0x00 ($0_{dec}$) |
| | 8130:06 | Use output as power supply | RW | 0x01 ($1_{dec}$) |
| 8140:0 [▶ 182] | SubIndex | DO Settings Ch.05 | RW | 0x06 ($6_{dec}$) |
| | 8140:01 | Detect openload in off state | RW | 0x00 ($0_{dec}$) |
| | 8140:02 | Detect openload in on state | RW | 0x00 ($0_{dec}$) |
| | 8140:03 | Detect short to 24V | RW | 0x00 ($0_{dec}$) |
| | 8140:04 | Safe state active | RW | 0x01 ($1_{dec}$) |
| | 8140:05 | Safe state value | RW | 0x00 ($0_{dec}$) |
| | 8140:06 | Use output as power supply | RW | 0x01 ($1_{dec}$) |
| 8150:0 [▶ 183] | SubIndex | DO Settings Ch.06 | RW | 0x06 ($6_{dec}$) |
| | 8150:01 | Detect openload in off state | RW | 0x00 ($0_{dec}$) |
| | 8150:02 | Detect openload in on state | RW | 0x00 ($0_{dec}$) |
| | 8150:03 | Detect short to 24V | RW | 0x00 ($0_{dec}$) |
| | 8150:04 | Safe state active | RW | 0x01 ($1_{dec}$) |
| | 8150:05 | Safe state value | RW | 0x00 ($0_{dec}$) |
| | 8150:06 | Use output as power supply | RW | 0x01 ($1_{dec}$) |
| 8160:0 [▶ 183] | SubIndex | DO Settings Ch.07 | RW | 0x06 ($6_{dec}$) |
| | 8160:01 | Detect openload in off state | RW | 0x00 ($0_{dec}$) |
| | 8160:02 | Detect openload in on state | RW | 0x00 ($0_{dec}$) |
| | 8160:03 | Detect short to 24V | RW | 0x00 ($0_{dec}$) |
| | 8160:04 | Safe state active | RW | 0x01 ($1_{dec}$) |
| | 8160:05 | Safe state value | RW | 0x00 ($0_{dec}$) |
| | 8160:06 | Use output as power supply | RW | 0x01 ($1_{dec}$) |
| 8170:0 [▶ 184] | SubIndex | DO Settings Ch.08 | RW | 0x06 ($6_{dec}$) |
| | 8170:01 | Detect openload in off state | RW | 0x00 ($0_{dec}$) |
| | 8170:02 | Detect openload in on state | RW | 0x00 ($0_{dec}$) |
| | 8170:03 | Detect short to 24V | RW | 0x00 ($0_{dec}$) |
| | 8170:04 | Safe state active | RW | 0x01 ($1_{dec}$) |

| Index | | Name | Flags | Default value |
|---|---|---|---|---|
| | 8170:05 | Safe state value | RW | 0x00 ($0_{dec}$) |
| | 8170:06 | Use output as power supply | RW | 0x01 ($1_{dec}$) |
| F000:0 [▶ 184] | SubIndex | Modular Device Profile | RO | 0x02 ($2_{dec}$) |
| | F000:01 | Index distance | RO | 0x0010 ($16_{dec}$) |
| | F000:02 | Maximum number of modules | RO | 0x0018 ($24_{dec}$) |
| F008 [▶ 184] | | Code word | RW | 0x00000000 ($0_{dec}$) |
| F010:0 [▶ 185] | SubIndex | Module Profile List | RO | 0x18 ($24_{dec}$) |
| | F010:01 | SubIndex 001 | RO | 0x00000064 ($100_{dec}$) |
| | F010:02 | SubIndex 002 | RO | 0x00000064 ($100_{dec}$) |
| | F010:03 | SubIndex 003 | RO | 0x00000064 ($100_{dec}$) |
| | F010:04 | SubIndex 004 | RO | 0x00000064 ($100_{dec}$) |
| | F010:05 | SubIndex 005 | RO | 0x00000064 ($100_{dec}$) |
| | F010:06 | SubIndex 006 | RO | 0x00000064 ($100_{dec}$) |
| | F010:07 | SubIndex 007 | RO | 0x00000064 ($100_{dec}$) |
| | F010:08 | SubIndex 008 | RO | 0x00000064 ($100_{dec}$) |
| | F010:09 | SubIndex 009 | RO | 0x00000064 ($100_{dec}$) |
| | F010:0A | SubIndex 010 | RO | 0x00000064 ($100_{dec}$) |
| | F010:0B | SubIndex 011 | RO | 0x00000064 ($100_{dec}$) |
| | F010:0C | SubIndex 012 | RO | 0x00000064 ($100_{dec}$) |
| | F010:0D | SubIndex 013 | RO | 0x00000064 ($100_{dec}$) |
| | F010:0E | SubIndex 014 | RO | 0x00000064 ($100_{dec}$) |
| | F010:0F | SubIndex 015 | RO | 0x00000064 ($100_{dec}$) |
| | F010:10 | SubIndex 016 | RO | 0x00000064 ($100_{dec}$) |
| | F010:11 | SubIndex 017 | RO | 0x000000C8 ($200_{dec}$) |
| | F010:12 | SubIndex 018 | RO | 0x000000C8 ($200_{dec}$) |
| | F010:13 | SubIndex 019 | RO | 0x000000C8 ($200_{dec}$) |
| | F010:14 | SubIndex 020 | RO | 0x000000C8 ($200_{dec}$) |
| | F010:15 | SubIndex 021 | RO | 0x000000C8 ($200_{dec}$) |
| | F010:16 | SubIndex 022 | RO | 0x000000C8 ($200_{dec}$) |
| | F010:17 | SubIndex 023 | RO | 0x000000C8 ($200_{dec}$) |
| | F010:18 | SubIndex 024 | RO | 0x000000C8 ($200_{dec}$) |
| F600:0 [▶ 185] | SubIndex | DEV Inputs | RO | 0x0F ($15_{dec}$) |
| | F600:01 | Undervoltage Us | RO | 0x00 ($0_{dec}$) |
| | F600:03 | Overtemperature | RO | 0x00 ($0_{dec}$) |
| | F600:0D | Diag | RO | 0x00 ($0_{dec}$) |
| | F600:0E | TxPDO State | RO | 0x00 ($0_{dec}$) |
| | F600:0F | Input cycle counter | RO | 0x00 ($0_{dec}$) |
| F900:0 [▶ 185] | SubIndex | DEV Info data | RO | 0x04 ($4_{dec}$) |
| | F900:02 | Internal Temperature | RO | 0x00 ($0_{dec}$) |
| | F900:04 | Voltage Us | RO | 0x0000 ($0_{dec}$) |
| FB00:0 [▶ 185] | SubIndex | DEV Command | RO | 0x03 ($3_{dec}$) |
| | FB00:01 | Request | RW | {0} |
| | FB00:02 | Status | RO | 0x00 ($0_{dec}$) |
| | FB00:03 | Response | RO | {0} |

Key

Flags:
RO (Read Only): this object can only be read
RW (Read/Write): this object can be read and written to

# 6.6 EP1839-0042 - Object description and parameterization

**EtherCAT XML Device Description**

The display matches that of the CoE objects from the EtherCAT XML Device Description. We recommend downloading the latest XML file from the download area of the Beckhoff website and installing it according to installation instructions.

**Parameterization via the CoE list (CAN over EtherCAT)**

The EtherCAT device is parameterized via the CoE - Online tab (double-click on the respective object) or via the Process Data tab (allocation of PDOs).

## 6.6.1 Standard objects (0x1000-0x1FFF)

The standard objects have the same meaning for all EtherCAT slaves.

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1000:0 | Device type | Device type of the EtherCAT device: the Lo-Word contains the used CoE profile (5001). The Hi-Word contains the module profile according to the modular device profile. | UINT32 | RO | 0x00001389 ($5001_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1008:0 | Device name | Name of the EtherCAT device | STRING | RO | EP1839-0042 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1009:0 | Hardware version | Hardware version of the EtherCAT device | STRING | RO | |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 100A:0 | Software version | Firmware version of the EtherCAT device | STRING | RO | 02 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 100B:0 | Bootloader version | Bootloader version of the EtherCAT device | STRING | RO | N/A |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1011:0 | Restore default parameters | Restore default settings | UINT8 | RO | 0x01 ($1_{dec}$) |
| 1011:01 | SubIndex 001 | If this object is set to **"0x64616F6C"** in the set value dialog, all backup objects are reset to their delivery state. | UINT32 | RW | 0x00000000 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1018:0 | Identity | Information for identifying the slave | UINT8 | RO | 0x04 ($4_{dec}$) |
| 1018:01 | Vendor ID | Vendor ID of the EtherCAT slave | UINT32 | RO | 0x00000002 ($2_{dec}$) |
| 1018:02 | Product code | Product code of the EtherCAT slave | UINT32 | RO | 0x072F4052 ($120537170_{dec}$) |
| 1018:03 | Revision | Revision number of the EtherCAT slave; the Low Word (bit 0-15) indicates the special terminal number, the High Word (bit 16-31) refers to the device description | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1018:04 | Serial number | Serial number of the EtherCAT slave; the Low Byte (bit 0-7) of the Low Word contains the year of production, the High Byte (bit 8-15) of the Low Word contains the week of production, the High Word (bit 16-31) is 0 | UINT32 | RO | 0x00000000 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 10E2:0 | Manufacturer-specific Identification Code | Maximum subindex | UINT8 | RO | 0x01 ($1_{dec}$) |
| 10E2:01 | SubIndex 001 | reserved | STRING | RO | |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 10F0:0 | Backup parameter handling | Information for standardized loading and saving of backup entries | UINT8 | RO | 0x01 ($1_{dec}$) |
| 10F00:01 | Checksum | Checksum across all backup entries of the EtherCAT slave | UINT32 | RO | 0x00000000 ($0_{dec}$) |

### Index 10F3 Diagnosis History

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 10F3:0 | Diagnosis History | Maximum subindex | UINT8 | RO | 0x15 ($21_{dec}$) |
| 10F3:01 | Maximum Messages | Maximum number of stored messages<br>A maximum of 16 messages can be stored | UINT8 | RO | 0x00 ($0_{dec}$) |
| 10F3:02 | Newest Message | Subindex of the latest message | UINT8 | RO | 0x00 ($0_{dec}$) |
| 10F3:03 | Newest Acknowledged Message | Subindex of the last confirmed message | UINT8 | RW | 0x00 ($0_{dec}$) |
| 10F3:04 | New Messages Available | Indicates that a new message is available | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 10F3:05 | Flags | not used | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 10F3:06 | Diagnosis Message 001 | Message 1 | OCTET-STRING[20] | RO | {0} |
| ... | ... | .. | ... | ... | ... |
| 10F3:15 | Diagnosis Message 016 | Message 16 | OCTET-STRING[20] | RO | {0} |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 10F8:0 | Timestamp Object | Timestamp | UINT64 | RO | |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 10F9:0 | Time Distribution Object | Maximum subindex | UINT8 | RO | 0x01 ($1_{dec}$) |
| 10F9:01 | Distributed Time Value | Object for time distribution by the EtherCAT master. | UINT64 | RW | |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1602:0 | DO 1 RxPDO-Map Output | PDO Mapping RxPDO 3 | UINT8 | RO | 0x08 ($8_{dec}$) |
| 1602:01 | SubIndex 001 | 1. PDO Mapping entry (object 0x7100 (DO Output Ch.01), entry 0x01 (Output)) | UINT32 | RO | 0x7100:01, 1 |
| 1602:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x7110 (DO Output Ch.02), entry 0x01 (Output)) | UINT32 | RO | 0x7110:01, 1 |
| 1602:03 | SubIndex 003 | 3. PDO Mapping entry (object 0x7120 (DO Output Ch.03), entry 0x01 (Output)) | UINT32 | RO | 0x7120:01, 1 |
| 1602:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x7130 (DO Output Ch.04), entry 0x01 (Output)) | UINT32 | RO | 0x7130:01, 1 |
| 1602:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x7140 (DO Output Ch.05), entry 0x01 (Output)) | UINT32 | RO | 0x7140:01, 1 |
| 1602:06 | SubIndex 006 | 6. PDO Mapping entry (object 0x7150 (DO Output Ch.06), entry 0x01 (Output)) | UINT32 | RO | 0x7150:01, 1 |
| 1602:07 | SubIndex 007 | 7. PDO Mapping entry (object 0x7160 (DO Output Ch.07), entry 0x01 (Output)) | UINT32 | RO | 0x7160:01, 1 |
| 1602:08 | SubIndex 008 | 8. PDO Mapping entry (object 0x7170 (DO Output Ch.08), entry 0x01 (Output)) | UINT32 | RO | 0x7170:01, 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A00:0 | DI TxPDO-Map Input | PDO Mapping TxPDO 1 | UINT8 | RO | 0x10 ($16_{dec}$) |
| 1A00:01 | SubIndex 001 | 1. PDO Mapping entry (object 0x6000 (Input Ch.01), entry 0x00 (Input Ch.01)) | UINT32 | RO | 0x6000:01, 1 |
| 1A00:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x6010 (DI Input Ch.02), entry 0x01 (Input)) | UINT32 | RO | 0x6010:01, 1 |
| 1A00:03 | SubIndex 003 | 3. PDO Mapping entry (object 0x6020 (DI Input Ch.03), entry 0x01 (Input)) | UINT32 | RO | 0x6020:01, 1 |
| 1A00:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6030 (DI Input Ch.04), entry 0x01 (Input)) | UINT32 | RO | 0x6030:01, 1 |
| 1A00:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6040 (DI Input Ch.05), entry 0x01 (Input)) | UINT32 | RO | 0x6040:01, 1 |
| 1A00:06 | SubIndex 006 | 6. PDO Mapping entry (object 0x6050 (DI Input Ch.06), entry 0x01 (Input)) | UINT32 | RO | 0x6050:01, 1 |
| 1A00:07 | SubIndex 007 | 7. PDO Mapping entry (object 0x6060 (DI Input Ch.07), entry 0x01 (Input)) | UINT32 | RO | 0x6060:01, 1 |
| 1A00:08 | SubIndex 008 | 8. PDO Mapping entry (object 0x6070 (DI Input Ch.08), entry 0x01 (Input)) | UINT32 | RO | 0x6070:01, 1 |
| 1A00:09 | SubIndex 009 | 9. PDO Mapping entry (object 0x6080 (DI Input Ch.09), entry 0x01 (Input)) | UINT32 | RO | 0x6080:01, 1 |
| 1A00:0A | SubIndex 010 | 10. PDO Mapping entry (object 0x6090 (DI Input Ch.10), entry 0x01 (Input)) | UINT32 | RO | 0x6090:01, 1 |
| 1A00:0B | SubIndex 011 | 11. PDO Mapping entry (object 0x60A0 (DI Input Ch.11), entry 0x01 (Input)) | UINT32 | RO | 0x60A00:01, 1 |
| 1A00:0C | SubIndex 012 | 12. PDO Mapping entry (object 0x60B0 (DI Input Ch.12), entry 0x01 (Input)) | UINT32 | RO | 0x60B00:01, 1 |
| 1A00:0D | SubIndex 013 | 13. PDO Mapping entry (object 0x60C0 (DI Input Ch.13), entry 0x01 (Input)) | UINT32 | RO | 0x60C00:01, 1 |
| 1A00:0E | SubIndex 014 | 14. PDO Mapping entry (object 0x60D0 (DI Input Ch.14), entry 0x01 (Input)) | UINT32 | RO | 0x60D00:01, 1 |
| 1A00:0F | SubIndex 015 | 15. PDO Mapping entry (object 0x60E0 (DI Input Ch.15), entry 0x01 (Input)) | UINT32 | RO | 0x60E00:01, 1 |
| 1A00:10 | SubIndex 016 | 16. PDO Mapping entry (object 0x60F0 (DI Input Ch.16), entry 0x01 (Input)) | UINT32 | RO | 0x60F00:01, 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A01:0 | DI TxPDO-Map Diagnosis | PDO Mapping TxPDO 2 | UINT8 | RO | 0x10 ($16_{dec}$) |
| 1A01:01 | SubIndex 001 | 1. PDO Mapping entry (object 0x6000 (Input Ch.01), entry 0x00 (Input Ch.01)) | UINT32 | RO | 0x6001:01, 1 |
| 1A01:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x6001 (Wirebreak Ch.01), entry 0x00 (Wirebreak Ch.01)) | UINT32 | RO | 0x6011:01, 1 |
| 1A01:03 | SubIndex 003 | 3. PDO Mapping entry (object 0x6021 (DI Diagnosis Ch.03), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x6021:01, 1 |
| 1A01:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6031 (DI Diagnosis Ch.04), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x6031:01, 1 |
| 1A01:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6041 (DI Diagnosis Ch.05), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x6041:01, 1 |
| 1A01:06 | SubIndex 006 | 6. PDO Mapping entry (object 0x6051 (DI Diagnosis Ch.06), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x6051:01, 1 |
| 1A01:07 | SubIndex 007 | 7. PDO Mapping entry (object 0x6061 (DI Diagnosis Ch.07), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x6061:01, 1 |
| 1A01:08 | SubIndex 008 | 8. PDO Mapping entry (object 0x6071 (DI Diagnosis Ch.08), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x6071:01, 1 |
| 1A01:09 | SubIndex 009 | 9. PDO Mapping entry (object 0x6081 (DI Diagnosis Ch.09), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x6081:01, 1 |
| 1A01:0A | SubIndex 010 | 10. PDO Mapping entry (object 0x6091 (DI Diagnosis Ch.10), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x6091:01, 1 |
| 1A01:0B | SubIndex 011 | 11. PDO Mapping entry (object 0x60A1 (DI Diagnosis Ch.11), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x60A1:01, 1 |
| 1A01:0C | SubIndex 012 | 12. PDO Mapping entry (object 0x60B1 (DI Diagnosis Ch.12), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x60B1:01, 1 |
| 1A01:0D | SubIndex 013 | 13. PDO Mapping entry (object 0x60C1 (DI Diagnosis Ch.13), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x60C1:01, 1 |
| 1A01:0E | SubIndex 014 | 14. PDO Mapping entry (object 0x60D1 (DI Diagnosis Ch.14), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x60D1:01, 1 |
| 1A01:0F | SubIndex 015 | 15. PDO Mapping entry (object 0x60E1 (DI Diagnosis Ch.15), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x60E1:01, 1 |
| 1A01:10 | SubIndex 016 | 16. PDO Mapping entry (object 0x60F1 (DI Diagnosis Ch.16), entry 0x01 (Wirebreak)) | UINT32 | RO | 0x60F1:01, 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A02:0 | DO TxPDO-Map Diagnosis | PDO Mapping TxPDO 3 | UINT8 | RO | 0x20 ($32_{dec}$) |
| 1A02:01 | SubIndex 001 | 1. PDO Mapping entry (object 0x6102 (DO Diagnosis Ch.01), entry 0x01 (Overcurrent)) | UINT32 | RO | 0x6102:01, 1 |
| 1A02:02 | SubIndex 002 | 2. PDO Mapping entry (object 0x6102 (DO Diagnosis Ch.01), entry 0x02 (Overload)) | UINT32 | RO | 0x6102:02, 1 |
| 1A02:03 | SubIndex 003 | 3. PDO Mapping entry (object 0x6102 (DO Diagnosis Ch.01), entry 0x03 (Open load)) | UINT32 | RO | 0x6102:03, 1 |
| 1A02:04 | SubIndex 004 | 4. PDO Mapping entry (object 0x6102 (DO Diagnosis Ch.01), entry 0x04 (Short to 24V)) | UINT32 | RO | 0x6102:04, 1 |
| 1A02:05 | SubIndex 005 | 5. PDO Mapping entry (object 0x6112 (DO Diagnosis Ch.02), entry 0x01 (Overcurrent)) | UINT32 | RO | 0x6112:01, 1 |
| 1A02:06 | SubIndex 006 | 6. PDO Mapping entry (object 0x6112 (DO Diagnosis Ch.02), entry 0x02 (Overload)) | UINT32 | RO | 0x6112:02, 1 |
| 1A02:07 | SubIndex 007 | 7. PDO Mapping entry (object 0x6112 (DO Diagnosis Ch.02), entry 0x03 (Open load)) | UINT32 | RO | 0x6112:03, 1 |
| 1A02:08 | SubIndex 008 | 8. PDO Mapping entry (object 0x6112 (DO Diagnosis Ch.02), entry 0x04 (Short to 24V)) | UINT32 | RO | 0x6112:04, 1 |
| 1A02:09 | SubIndex 009 | 9. PDO Mapping entry (object 0x6122 (DO Diagnosis Ch.03), entry 0x01 (Overcurrent)) | UINT32 | RO | 0x6122:01, 1 |
| 1A02:0A | SubIndex 010 | 10. PDO Mapping entry (object 0x6122 (DO Diagnosis Ch.03), entry 0x02 (Overload)) | UINT32 | RO | 0x6122:02, 1 |
| 1A02:0B | SubIndex 011 | 11. PDO Mapping entry (object 0x6122 (DO Diagnosis Ch.03), entry 0x03 (Open load)) | UINT32 | RO | 0x6122:03, 1 |
| 1A02:0C | SubIndex 012 | 12. PDO Mapping entry (object 0x6122 (DO Diagnosis Ch.03), entry 0x04 (Short to 24V)) | UINT32 | RO | 0x6122:04, 1 |
| 1A02:0D | SubIndex 013 | 13. PDO Mapping entry (object 0x6132 (DO Diagnosis Ch.04), entry 0x01 (Overcurrent)) | UINT32 | RO | 0x6132:01, 1 |
| 1A02:0E | SubIndex 014 | 14. PDO Mapping entry (object 0x6132 (DO Diagnosis Ch.04), entry 0x02 (Overload)) | UINT32 | RO | 0x6132:02, 1 |
| 1A02:0F | SubIndex 015 | 15. PDO Mapping entry (object 0x6132 (DO Diagnosis Ch.04), entry 0x03 (Open load)) | UINT32 | RO | 0x6132:03, 1 |
| 1A02:10 | SubIndex 016 | 16. PDO Mapping entry (object 0x6132 (DO Diagnosis Ch.04), entry 0x04 (Short to 24V)) | UINT32 | RO | 0x6132:04, 1 |
| 1A02:11 | SubIndex 017 | 17. PDO Mapping entry (object 0x6142 (DO Diagnosis Ch.05), entry 0x01 (Overcurrent)) | UINT32 | RO | 0x6142:01, 1 |
| 1A02:12 | SubIndex 018 | 18. PDO Mapping entry (object 0x6142 (DO Diagnosis Ch.05), entry 0x02 (Overload)) | UINT32 | RO | 0x6142:02, 1 |
| 1A02:13 | SubIndex 019 | 19. PDO Mapping entry (object 0x6142 (DO Diagnosis Ch.05), entry 0x03 (Open load)) | UINT32 | RO | 0x6142:03, 1 |
| 1A02:14 | SubIndex 020 | 20. PDO Mapping entry (object 0x6142 (DO Diagnosis Ch.05), entry 0x04 (Short to 24V)) | UINT32 | RO | 0x6142:04, 1 |
| 1A02:15 | SubIndex 021 | 21. PDO Mapping entry (object 0x6152 (DO Diagnosis Ch.06), entry 0x01 (Overcurrent)) | UINT32 | RO | 0x6152:01, 1 |
| 1A02:16 | SubIndex 022 | 22. PDO Mapping entry (object 0x6152 (DO Diagnosis Ch.06), entry 0x02 (Overload)) | UINT32 | RO | 0x6152:02, 1 |
| 1A02:17 | SubIndex 023 | 23. PDO Mapping entry (object 0x6152 (DO Diagnosis Ch.06), entry 0x03 (Open load)) | UINT32 | RO | 0x6152:03, 1 |
| 1A02:18 | SubIndex 024 | 24. PDO Mapping entry (object 0x6152 (DO Diagnosis Ch.06), entry 0x04 (Short to 24V)) | UINT32 | RO | 0x6152:04, 1 |
| 1A02:19 | SubIndex 025 | 25. PDO Mapping entry (object 0x6162 (DO Diagnosis Ch.07), entry 0x01 (Overcurrent)) | UINT32 | RO | 0x6162:01, 1 |
| 1A02:1A | SubIndex 026 | 26. PDO Mapping entry (object 0x6162 (DO Diagnosis Ch.07), entry 0x02 (Overload)) | UINT32 | RO | 0x6162:02, 1 |
| 1A02:1B | SubIndex 027 | 27. PDO Mapping entry (object 0x6162 (DO Diagnosis Ch.07), entry 0x03 (Open load)) | UINT32 | RO | 0x6162:03, 1 |
| 1A02:1C | SubIndex 028 | 28. PDO Mapping entry (object 0x6162 (DO Diagnosis Ch.07), entry 0x04 (Short to 24V)) | UINT32 | RO | 0x6162:04, 1 |
| 1A02:1D | SubIndex 029 | 29. PDO Mapping entry (object 0x6172 (DO Diagnosis Ch.08), entry 0x01 (Overcurrent)) | UINT32 | RO | 0x6172:01, 1 |
| 1A02:1E | SubIndex 030 | 30. PDO Mapping entry (object 0x6172 (DO Diagnosis Ch.08), entry 0x02 (Overload)) | UINT32 | RO | 0x6172:02, 1 |
| 1A02:1F | SubIndex 031 | 31. PDO Mapping entry (object 0x6172 (DO Diagnosis Ch.08), entry 0x03 (Open load)) | UINT32 | RO | 0x6172:03, 1 |
| 1A02:20 | SubIndex 032 | 32. PDO Mapping entry (object 0x6172 (DO Diagnosis Ch.08), entry 0x04 (Short to 24V)) | UINT32 | RO | 0x6172:04, 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1A03:0 | DEV TxPDO-Map Inputs Device | PDO Mapping TxPDO 4 | UINT8 | RO | 0x07 ($7_{dec}$) |
| 1A03:01 | SubIndex 001 | 1. PDO Mapping entry (object 0xF600 (DEV Inputs), entry 0x01 (Undervoltage Us)) | UINT32 | RO | 0xF600:01, 1 |
| 1A03:02 | SubIndex 002 | 2. PDO Mapping entry (1 bits align) | UINT32 | RO | 0x0000:00, 1 |
| 1A03:03 | SubIndex 003 | 3. PDO Mapping entry (object 0xF600 (DEV Inputs), entry 0x03 (Overtemperature)) | UINT32 | RO | 0xF600:03, 1 |
| 1A03:04 | SubIndex 004 | 4. PDO Mapping entry (9 bits align) | UINT32 | RO | 0x0000:00, 9 |
| 1A03:05 | SubIndex 005 | 5. PDO Mapping entry (object 0xF600 (DEV Inputs), entry 0x0D (Diag)) | UINT32 | RO | 0xF600:0D, 1 |
| 1A03:06 | SubIndex 006 | 6. PDO Mapping entry (object 0xF600 (DEV Inputs), entry 0x0E (TxPDO State)) | UINT32 | RO | 0xF600:0E, 1 |
| 1A03:07 | SubIndex 007 | 7. PDO Mapping entry (object 0xF600 (DEV Inputs), entry 0x0F (Input cycle counter)) | UINT32 | RO | 0xF600:0F, 2 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C00:0 | Sync manager type | Using the Sync Managers | UINT8 | RO | 0x04 ($4_{dec}$) |
| 1C00:01 | SubIndex 001 | Sync-Manager Type Channel 1: Mailbox Write | UINT8 | RO | 0x01 ($1_{dec}$) |
| 1C00:02 | SubIndex 002 | Sync-Manager Type Channel 2: Mailbox Read | UINT8 | RO | 0x02 ($2_{dec}$) |
| 1C00:03 | SubIndex 003 | Sync-Manager Type Channel 3: Process Data Write (Outputs) | UINT8 | RO | 0x03 ($3_{dec}$) |
| 1C00:04 | SubIndex 004 | Sync-Manager Type Channel 4: Process Data Read (Inputs) | UINT8 | RO | 0x04 ($4_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C12:0 | RxPDO assign | PDO Assign Outputs | UINT8 | RW | 0x01 ($1_{dec}$) |
| 1C12:01 | Subindex 001 | 1. allocated RxPDO (contains the index of the associated RxPDO Mapping object) | UINT16 | RW | 0x1602 ($5634_{dec}$) |
| 1C12:02 | Subindex 002 | 2. allocated RxPDO (contains the index of the associated RxPDO Mapping object) | UINT16 | RW | 0x0000 (0dec) |
| 1C12:03 | Subindex 003 | 3. allocated RxPDO (contains the index of the associated RxPDO Mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C12:04 | Subindex 004 | 4. allocated RxPDO (contains the index of the associated RxPDO Mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C12:05 | Subindex 005 | 5. allocated RxPDO (contains the index of the associated RxPDO Mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C12:06 | Subindex 006 | 6. allocated RxPDO (contains the index of the associated RxPDO Mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C12:07 | Subindex 007 | 7. allocated RxPDO (contains the index of the associated RxPDO Mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C12:08 | Subindex 008 | 8. allocated RxPDO (contains the index of the associated RxPDO Mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C13:0 | TxPDO assign | PDO Assign Inputs | UINT8 | RW | 0x04 ($4_{dec}$) |
| 1C13:01 | Subindex 001 | 1. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x1A00 ($6656_{dec}$) |
| 1C13:02 | Subindex 002 | 2. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x1A01 ($6657_{dec}$) |
| 1C13:03 | Subindex 003 | 3. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x1A02 ($6658_{dec}$) |
| 1C13:04 | Subindex 004 | 4. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x1A03 ($6659_{dec}$) |
| 1C13:05 | Subindex 005 | 5. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:06 | Subindex 006 | 6. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:07 | Subindex 007 | 7. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:08 | Subindex 008 | 8. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:09 | Subindex 009 | 9. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:0A | Subindex 010 | 10. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:0B | Subindex 011 | 11. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:0C | Subindex 012 | 12. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:0D | Subindex 013 | 13. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:0E | Subindex 014 | 14. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:0F | Subindex 015 | 15. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:10 | Subindex 016 | 16. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:11 | Subindex 017 | 17. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:12 | Subindex 018 | 18. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:13 | Subindex 019 | 19. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:14 | Subindex 020 | 20. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:15 | Subindex 021 | 21. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:16 | Subindex 022 | 22. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:17 | Subindex 023 | 23. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:18 | Subindex 024 | 24. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:19 | Subindex 025 | 25. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:1A | Subindex 026 | 26. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:1B | Subindex 027 | 27. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:1C | Subindex 028 | 28. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:1D | Subindex 029 | 29. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:1E | Subindex 030 | 30. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:1F | Subindex 031 | 31. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:20 | Subindex 032 | 32. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C13:21 | Subindex 033 | 33. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:22 | Subindex 034 | 34. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:23 | Subindex 035 | 35. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:24 | Subindex 036 | 36. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:25 | Subindex 037 | 37. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:26 | Subindex 038 | 38. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:27 | Subindex 039 | 39. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:28 | Subindex 040 | 40. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C13:29 | Subindex 041 | 41. allocated TxPDO (contains the index of the associated TxPDO mapping object) | UINT16 | RW | 0x0000 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C32:0 | SM output parameter | Synchronization parameters for the outputs | UINT8 | RO | 0x20 ($32_{dec}$) |
| 1C32:01 | Sync mode | Current synchronization mode:<br>0: Free Run<br>1: Synchron with SM 2 Event<br>2: DC-Mode - Synchron with SYNC0 Event<br>3: DC-Mode - Synchron with SYNC1 Event | UINT16 | RW | 0x0001 ($1_{dec}$) |
| 1C32:02 | Cycle time | Cycle time (in ns):<br>Free Run: cycle time of the local timer<br>Synchronous with SM 2 Event: cycle time of the master<br>DC-Mode: SYNC0/SYNC1 Cycle Time | UINT32 | RW | 0x000F4240 ($1000000_{dec}$) |
| 1C32:03 | Shift time | Time between SYNC0 event and output of the outputs (in ns, DC mode only) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C32:04 | Sync modes supported | Supported synchronization modes:<br>Bit 0 = 1: Free Run is supported<br>Bit 1 = 1: Synchron with SM 2 Event is supported<br>Bit 2-3 = 01: DC-Mode is supported<br>Bit 4-5 = 10: Output Shift with SYNC1 event (only DC mode)<br>Bit 14 = 1: dynamic times (measurement through writing of 1C32:08) | UINT16 | RO | 0x440B ($17419_{dec}$) |
| 1C32:05 | Minimum cycle time | Minimum cycle time (in ns) | UINT32 | RO | 0x000249F0 ($150000_{dec}$) |
| 1C32:06 | Calc and copy time | Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C32:07 | Minimum delay time | | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C32:08 | Get Cycle Time | 0: Measurement of the local cycle time is stopped<br>1: Measurement of the local cycle time is started<br>The entries 1C32:03, 1C32:05, 1C32:06, 1C32:09, 1C33:03, 1C33:06, 1C33:09 are updated with the maximum measured values.<br>For a subsequent measurement the measured values are reset | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C32:09 | Maximum delay time | Time between SYNC1 event and output of the outputs (in ns, DC mode only) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C32:0B | SM event missed counter | Number of missed SM events in OPERATIONAL (DC mode only) | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C32:0C | Cycle exceeded counter | Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early) | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C32:0D | Shift too short counter | Number of occasions that the interval between SYNC0 and SYNC1 event was too short (DC mode only) | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C32:20 | Sync error | The synchronization was not correct in the last cycle (outputs were output too late; DC mode only) | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 1C33:0 | SM input parameter | Synchronization parameters for the inputs | UINT8 | RO | 0x20 ($32_{dec}$) |
| 1C33:01 | Sync mode | Current synchronization mode:<br>0: Free Run<br>1: Synchron with SM 3 event (no outputs available)<br>2: DC - Synchron with SYNC0 Event<br>3: DC - Synchron with SYNC1 Event<br>34: Synchron with SM 2 event (outputs available) | UINT16 | RW | 0x0022 ($34_{dec}$) |
| 1C33:02 | Cycle time | as 1C32:02 | UINT32 | RW | 0x000F4240 ($1000000_{dec}$) |
| 1C33:03 | Shift time | Time between SYNC0 event and reading of the inputs (in ns, only DC mode) | UINT32 | RO | 0x000249F0 ($150000_{dec}$) |
| 1C33:04 | Sync modes supported | Supported synchronization modes:<br>Bit 0: Free Run is supported<br>Bit 1: Synchron with SM 2 Event is supported (outputs available)<br>Bit 1: Synchron with SM 3 Event is supported (no outputs available)<br>Bit 2-3 = 01: DC-Mode is supported<br>Bit 4-5 = 01: Input Shift through local event (outputs available)<br>Bit 4-5 = 10: Input Shift with SYNC1 event (no outputs available)<br>Bit 14 = 1: dynamic times (measurement through writing of 1C32:08 or 1C33:08) | UINT16 | RO | 0x440B ($17419_{dec}$) |
| 1C33:05 | Minimum cycle time | as 1C32:05 | UINT32 | RO | 0x000249F0 ($150000_{dec}$) |
| 1C33:06 | Calc and copy time | Time between reading of the inputs and availability of the inputs for the master (in ns, only DC mode) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:07 | Minimum delay time | | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:08 | Get Cycle Time | as 1C32:08 | UINT16 | RW | 0x0000 ($0_{dec}$) |
| 1C33:09 | Maximum delay time | Time between SYNC1 event and reading of the inputs (in ns, only DC mode) | UINT32 | RO | 0x00000000 ($0_{dec}$) |
| 1C33:0B | SM event missed counter | as 1C32:11 | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:0C | Cycle exceeded counter | as 1C32:12 | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:0D | Shift too short counter | as 1C32:13 | UINT16 | RO | 0x0000 ($0_{dec}$) |
| 1C33:20 | Sync error | as 1C32:32 | BOOLEAN | RO | 0x00 ($0_{dec}$) |

## 6.6.2 Profile-specific objects (0x6000-0xFFFF)

The profile-specific objects have the same meaning for all EtherCAT slaves that support the profile 5001.

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6000:0 | DI Input Ch.01 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6000:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6001:0 | DI Diagnosis Ch.01 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6001:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6010:0 | DI Input Ch.02 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6010:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6011:0 | DI Diagnosis Ch.02 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6011:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6020:0 | DI Input Ch.03 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6020:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6021:0 | DI Diagnosis Ch.03 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6021:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6030:0 | DI Input Ch.04 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6030:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6031:0 | DI Diagnosis Ch.04 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6031:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6040:0 | DI Input Ch.05 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6040:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6041:0 | DI Diagnosis Ch.05 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6041:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6050:0 | DI Input Ch.06 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6050:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6051:0 | DI Diagnosis Ch.06 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6051:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6060:0 | DI Input Ch.07 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6060:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6061:0 | DI Diagnosis Ch.07 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6061:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6070:0 | DI Input Ch.08 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6070:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6071:0 | DI Diagnosis Ch.08 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6071:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6080:0 | DI Input Ch.09 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6080:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6081:0 | DI Diagnosis Ch.09 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6081:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6090:0 | DI Input Ch.10 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6090:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6091:0 | DI Diagnosis Ch.10 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 6091:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60A0:0 | DI Input Ch.11 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60A00:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60A1:0 | DI Diagnosis Ch.11 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60A1:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60B0:0 | DI Input Ch.12 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60B00:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60B1:0 | DI Diagnosis Ch.12 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60B1:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60C0:0 | DI Input Ch.13 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60C00:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60C1:0 | DI Diagnosis Ch.13 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60C1:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60D0:0 | DI Input Ch.14 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60D00:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60D1:0 | DI Diagnosis Ch.14 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60D1:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60E0:0 | DI Input Ch.15 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60E00:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60E1:0 | DI Diagnosis Ch.15 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60E1:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60F0:0 | DI Input Ch.16 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60F00:01 | Input | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 60F1:0 | DI Diagnosis Ch.16 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 60F1:01 | Wirebreak | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6102:0 | DO Diagnosis Ch.01 | Process data | UINT8 | RO | 0x04 ($4_{dec}$) |
| 6102:01 | Overcurrent | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6102:02 | Overload | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6102:03 | Open load | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6102:04 | Short to 24V | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6112:0 | DO Diagnosis Ch.02 | Process data | UINT8 | RO | 0x04 ($4_{dec}$) |
| 6112:01 | Overcurrent | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6112:02 | Overload | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6112:03 | Open load | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6112:04 | Short to 24V | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6122:0 | DO Diagnosis Ch.03 | Process data | UINT8 | RO | 0x04 ($4_{dec}$) |
| 6122:01 | Overcurrent | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6122:02 | Overload | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6122:03 | Open load | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6122:04 | Short to 24V | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6132:0 | DO Diagnosis Ch.04 | Process data | UINT8 | RO | 0x04 ($4_{dec}$) |
| 6132:01 | Overcurrent | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6132:02 | Overload | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6132:03 | Open load | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6132:04 | Short to 24V | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6142:0 | DO Diagnosis Ch.05 | Process data | UINT8 | RO | 0x04 ($4_{dec}$) |
| 6142:01 | Overcurrent | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6142:02 | Overload | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6142:03 | Open load | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6142:04 | Short to 24V | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6152:0 | DO Diagnosis Ch.06 | Process data | UINT8 | RO | 0x04 ($4_{dec}$) |
| 6152:01 | Overcurrent | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6152:02 | Overload | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6152:03 | Open load | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6152:04 | Short to 24V | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6162:0 | DO Diagnosis Ch.07 | Process data | UINT8 | RO | 0x04 ($4_{dec}$) |
| 6162:01 | Overcurrent | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6162:02 | Overload | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6162:03 | Open load | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6162:04 | Short to 24V | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 6172:0 | DO Diagnosis Ch.08 | Process data | UINT8 | RO | 0x04 ($4_{dec}$) |
| 6172:01 | Overcurrent | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6172:02 | Overload | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6172:03 | Open load | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| 6172:04 | Short to 24V | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 7100:0 | DO Output Ch.01 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 7100:01 | Output | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 7110:0 | DO Output Ch.02 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 7110:01 | Output | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 7120:0 | DO Output Ch.03 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 7120:01 | Output | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 7130:0 | DO Output Ch.04 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 7130:01 | Output | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 7140:0 | DO Output Ch.05 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 7140:01 | Output | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 7150:0 | DO Output Ch.06 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 7150:01 | Output | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 7160:0 | DO Output Ch.07 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 7160:01 | Output | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 7170:0 | DO Output Ch.08 | Process data | UINT8 | RO | 0x01 ($1_{dec}$) |
| 7170:01 | Output | | BOOLEAN | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8000:0 | DI Settings Ch.01 | Parameters for the digital input channel 1:<br>Connection X01, Pin 4 / Input A. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8000:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8000:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8000:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8010:0 | DI Settings Ch.02 | Parameters for the digital input channel 2:<br>Connection X01, Pin 2 / Input B. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8010:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8010:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8010:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8020:0 | DI Settings Ch.03 | Parameters for the digital input channel 3:<br>Connection X02, Pin 4 / Input A. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8020:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8020:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8020:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8030:0 | DI Settings Ch.04 | Parameters for the digital input channel 4: Connection X02, Pin 2 / Input B. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8030:01 | Enable open load detection | Enable wire break detection. See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8030:11 | Filter time | Set input filter time. See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8030:12 | Signal extension time | Set pulse extension. See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8040:0 | DI Settings Ch.05 | Parameters for the digital input channel 5: Connection X03, Pin 4 / Input A. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8040:01 | Enable open load detection | Enable wire break detection. See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8040:11 | Filter time | Set input filter time. See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8040:12 | Signal extension time | Set pulse extension. See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8050:0 | DI Settings Ch.06 | Parameters for the digital input channel 6: Connection X03, Pin 2 / Input B. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8050:01 | Enable open load detection | Enable wire break detection. See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8050:11 | Filter time | Set input filter time. See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8050:12 | Signal extension time | Set pulse extension. See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8060:0 | DI Settings Ch.07 | Parameters for the digital input channel 7: Connection X04, Pin 4 / Input A. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8060:01 | Enable open load detection | Enable wire break detection. See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8060:11 | Filter time | Set input filter time. See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8060:12 | Signal extension time | Set pulse extension. See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8070:0 | DI Settings Ch.08 | Parameters for the digital input channel 8: Connection X04, Pin 2 / Input B. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8070:01 | Enable open load detection | Enable wire break detection. See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8070:11 | Filter time | Set input filter time. See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8070:12 | Signal extension time | Set pulse extension. See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8080:0 | DI Settings Ch.09 | Parameters for the digital input channel 9:<br>Connection X05, Pin 4 / Input A. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8080:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8080:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8080:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8090:0 | DI Settings Ch.10 | Parameters for the digital input channel 10:<br>Connection X05, Pin 2 / Input B. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 8090:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 8090:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 8090:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 80A0:0 | DI Settings Ch.11 | Parameters for the digital input channel 11:<br>Connection X06, Pin 4 / Input A. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 80A00:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 80A00:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 80A00:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 80B0:0 | DI Settings Ch.12 | Parameters for the digital input channel 12:<br>Connection X06, Pin 2 / Input B. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 80B00:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 80B00:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 80B00:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 80C0:0 | DI Settings Ch.13 | Parameters for the digital input channel 13:<br>Connection X07, Pin 4 / Input A. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 80C00:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 80C00:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 80C00:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 80D0:0 | DI Settings Ch.14 | Parameters for the digital input channel 14:<br>Connection X07, Pin 2 / Input B. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 80D00:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 80D00:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 80D00:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 80E0:0 | DI Settings Ch.15 | Parameters for the digital input channel 15:<br>Connection X08, Pin 4 / Input A. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 80E00:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 80E00:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 80E00:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 80F0:0 | DI Settings Ch.16 | Parameters for the digital input channel 16:<br>Connection X08, Pin 2 / Input B. | UINT8 | RO | 0x12 ($18_{dec}$) |
| 80F00:01 | Enable open load detection | Enable wire break detection.<br>See chapter Wire break detection [▶ 111]. | BOOLEAN | RW | 0 |
| 80F00:11 | Filter time | Set input filter time.<br>See chapter Input filter [▶ 107]. | UINT16 | RW | 0 |
| 80F00:12 | Signal extension time | Set pulse extension.<br>See chapter Pulse extension [▶ 109]. | UINT16 | RW | 0 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8100:0 | DO Settings Ch.01 | Parameters for the sensor supply output at connection X01.<br>See chapter Configure sensor supply (EP1839-0042 only) [▶ 113]. | UINT8 | RO | 0x06 (6dec) |
| 8100:01 | Detect openload in off state | Enable wire break detection for the "off" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8100:02 | Detect openload in on state | Enable wire break detection for the "on" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8100:03 | Detect short to 24V | Enable 24 V short-circuit detection.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8100:04 | Safe state active | Enable the function "Safe state".<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 1 |
| 8100:05 | Safe state value | Default of Safe state.<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 0 |
| 8100:06 | Use output as power supply | 0: The output can be switched via the process data.<br>1: The output is permanently switched on.<br>See chapter Switching outputs [▶ 113]. | BOOLEAN | RW | 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8110:0 | DO Settings Ch.02 | Parameters for the sensor supply output at connection X02.<br>See chapter Configure sensor supply (EP1839-0042 only) [▶ 113]. | UINT8 | RO | 0x06 ($6_{dec}$) |
| 8110:01 | Detect openload in off state | Enable wire break detection for the "off" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8110:02 | Detect openload in on state | Enable wire break detection for the "on" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8110:03 | Detect short to 24V | Enable 24 V short-circuit detection.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8110:04 | Safe state active | Enable the function "Safe state".<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 1 |
| 8110:05 | Safe state value | Default of Safe state.<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 0 |
| 8110:06 | Use output as power supply | 0: The output can be switched via the process data.<br>1: The output is permanently switched on.<br>See chapter Switching outputs [▶ 113]. | BOOLEAN | RW | 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8120:0 | DO Settings Ch.03 | Parameters for the sensor supply output at connection X03.<br>See chapter Configure sensor supply (EP1839-0042 only) [▶ 113]. | UINT8 | RO | 0x06 ($6_{dec}$) |
| 8120:01 | Detect openload in off state | Enable wire break detection for the "off" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8120:02 | Detect openload in on state | Enable wire break detection for the "on" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8120:03 | Detect short to 24V | Enable 24 V short-circuit detection.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8120:04 | Safe state active | Enable the function "Safe state".<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 1 |
| 8120:05 | Safe state value | Default of Safe state.<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 0 |
| 8120:06 | Use output as power supply | 0: The output can be switched via the process data.<br>1: The output is permanently switched on.<br>See chapter Switching outputs [▶ 113]. | BOOLEAN | RW | 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8130:0 | DO Settings Ch.04 | Parameters for the sensor supply output at connection X04.<br>See chapter Configure sensor supply (EP1839-0042 only) [▶ 113]. | UINT8 | RO | 0x06 ($6_{dec}$) |
| 8130:01 | Detect openload in off state | Enable wire break detection for the "off" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8130:02 | Detect openload in on state | Enable wire break detection for the "on" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8130:03 | Detect short to 24V | Enable 24 V short-circuit detection.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8130:04 | Safe state active | Enable the function "Safe state".<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 1 |
| 8130:05 | Safe state value | Default of Safe state.<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 0 |
| 8130:06 | Use output as power supply | 0: The output can be switched via the process data.<br>1: The output is permanently switched on.<br>See chapter Switching outputs [▶ 113]. | BOOLEAN | RW | 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8140:0 | DO Settings Ch.05 | Parameters for the sensor supply output at connection X05.<br>See chapter Configure sensor supply (EP1839-0042 only) [▶ 113]. | UINT8 | RO | 0x06 ($6_{dec}$) |
| 8140:01 | Detect openload in off state | Enable wire break detection for the "off" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8140:02 | Detect openload in on state | Enable wire break detection for the "on" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8140:03 | Detect short to 24V | Enable 24 V short-circuit detection.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8140:04 | Safe state active | Enable the function "Safe state".<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 1 |
| 8140:05 | Safe state value | Default of Safe state.<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 0 |
| 8140:06 | Use output as power supply | 0: The output can be switched via the process data.<br>1: The output is permanently switched on.<br>See chapter Switching outputs [▶ 113]. | BOOLEAN | RW | 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8150:0 | DO Settings Ch.06 | Parameters for the sensor supply output at connection X06.<br>See chapter Configure sensor supply (EP1839-0042 only) [▶ 113]. | UINT8 | RO | 0x06 ($6_{dec}$) |
| 8150:01 | Detect openload in off state | Enable wire break detection for the "off" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8150:02 | Detect openload in on state | Enable wire break detection for the "on" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8150:03 | Detect short to 24V | Enable 24 V short-circuit detection.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8150:04 | Safe state active | Enable the function "Safe state".<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 1 |
| 8150:05 | Safe state value | Default of Safe state.<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 0 |
| 8150:06 | Use output as power supply | 0: The output can be switched via the process data.<br>1: The output is permanently switched on.<br>See chapter Switching outputs [▶ 113]. | BOOLEAN | RW | 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8160:0 | DO Settings Ch.07 | Parameters for the sensor supply output at connection X07.<br>See chapter Configure sensor supply (EP1839-0042 only) [▶ 113]. | UINT8 | RO | 0x06 ($6_{dec}$) |
| 8160:01 | Detect openload in off state | Enable wire break detection for the "off" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8160:02 | Detect openload in on state | Enable wire break detection for the "on" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8160:03 | Detect short to 24V | Enable 24 V short-circuit detection.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8160:04 | Safe state active | Enable the function "Safe state".<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 1 |
| 8160:05 | Safe state value | Default of Safe state.<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 0 |
| 8160:06 | Use output as power supply | 0: The output can be switched via the process data.<br>1: The output is permanently switched on.<br>See chapter Switching outputs [▶ 113]. | BOOLEAN | RW | 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 8170:0 | DO Settings Ch.08 | Parameters for the sensor supply output at connection X08.<br>See chapter Configure sensor supply (EP1839-0042 only) [▶ 113]. | UINT8 | RO | 0x06 ($6_{dec}$) |
| 8170:01 | Detect openload in off state | Enable wire break detection for the "off" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8170:02 | Detect openload in on state | Enable wire break detection for the "on" state.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8170:03 | Detect short to 24V | Enable 24 V short-circuit detection.<br>See chapter Diagnostics [▶ 116]. | BOOLEAN | RW | 0 |
| 8170:04 | Safe state active | Enable the function "Safe state".<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 1 |
| 8170:05 | Safe state value | Default of Safe state.<br>See chapter Behavior on EtherCAT failure [▶ 114]. | BOOLEAN | RW | 0 |
| 8170:06 | Use output as power supply | 0: The output can be switched via the process data.<br>1: The output is permanently switched on.<br>See chapter Switching outputs [▶ 113]. | BOOLEAN | RW | 1 |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F000:0 | Modular Device Profile | General information for the modular device profile | UINT8 | RO | 0x02 ($2_{dec}$) |
| F000:01 | Index distance | Index distance of the objects of the individual channels | UINT16 | RO | 0x0010 ($16_{dec}$) |
| F000:02 | Maximum number of modules | Number of channels | UINT16 | RO | 0x0018 ($24_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F008:0 | Code word | reserved | UINT32 | RW | 0x00000000 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F010:0 | Module Profile List | Maximum subindex | UINT8 | RO | 0x18 ($24_{dec}$) |
| F010:01 | SubIndex 001 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:02 | SubIndex 002 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:03 | SubIndex 003 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:04 | SubIndex 004 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:05 | SubIndex 005 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:06 | SubIndex 006 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:07 | SubIndex 007 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:08 | SubIndex 008 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:09 | SubIndex 009 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:0A | SubIndex 010 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:0B | SubIndex 011 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:0C | SubIndex 012 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:0D | SubIndex 013 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:0E | SubIndex 014 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:0F | SubIndex 015 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:10 | SubIndex 016 | reserved | UINT32 | RO | 0x00000064 ($100_{dec}$) |
| F010:11 | SubIndex 017 | reserved | UINT32 | RO | 0x000000C8 ($200_{dec}$) |
| F010:12 | SubIndex 018 | reserved | UINT32 | RO | 0x000000C8 ($200_{dec}$) |
| F010:13 | SubIndex 019 | reserved | UINT32 | RO | 0x000000C8 ($200_{dec}$) |
| F010:14 | SubIndex 020 | reserved | UINT32 | RO | 0x000000C8 ($200_{dec}$) |
| F010:15 | SubIndex 021 | reserved | UINT32 | RO | 0x000000C8 ($200_{dec}$) |
| F010:16 | SubIndex 022 | reserved | UINT32 | RO | 0x000000C8 ($200_{dec}$) |
| F010:17 | SubIndex 023 | reserved | UINT32 | RO | 0x000000C8 ($200_{dec}$) |
| F010:18 | SubIndex 024 | reserved | UINT32 | RO | 0x000000C8 ($200_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F600:0 | DEV Inputs | Process data | UINT8 | RO | 0x0F ($15_{dec}$) |
| F600:01 | Undervoltage Us | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| F600:03 | Overtemperature | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| F600:0D | Diag | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| F600:0E | TxPDO State | | BOOLEAN | RO | 0x00 ($0_{dec}$) |
| F600:0F | Input cycle counter | | BIT2 | RO | 0x00 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| F900:0 | DEV Info data | Maximum subindex | UINT8 | RO | 0x04 ($4_{dec}$) |
| F900:02 | Internal Temperature | Internal temperature | INT8 | RO | 0x00 ($0_{dec}$) |
| F900:04 | Voltage Us | Measured value of the supply voltage $U_S$ | UINT16 | RO | 0x0000 ($0_{dec}$) |

| Index (hex) | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| FB00:0 | DEV Command | Command interface | UINT8 | RO | 0x03 ($3_{dec}$) |
| FB00:01 | Request | Request | OCTET-STRING[2] | RW | {0} |
| FB00:02 | Status | Status | UINT8 | RO | 0x00 ($0_{dec}$) |
| FB00:03 | Response | Response | OCTET-STRING[8] | RO | {0} |

# 7 Appendix

## 7.1 General operating conditions

### Protection degrees (IP-Code)

The standard IEC 60529 (DIN EN 60529) defines the degrees of protection in different classes.

| 1. Number: dust protection and touch guard | Definition |
|---|---|
| 0 | Non-protected |
| 1 | Protected against access to hazardous parts with the back of a hand. Protected against solid foreign objects of Ø 50 mm |
| 2 | Protected against access to hazardous parts with a finger. Protected against solid foreign objects of Ø 12.5 mm. |
| 3 | Protected against access to hazardous parts with a tool. Protected against solid foreign objects Ø 2.5 mm. |
| 4 | Protected against access to hazardous parts with a wire. Protected against solid foreign objects Ø 1 mm. |
| 5 | Protected against access to hazardous parts with a wire. Dust-protected. Intrusion of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the device or to impair safety. |
| 6 | Protected against access to hazardous parts with a wire. Dust-tight. No intrusion of dust. |

| 2. Number: water* protection | Definition |
|---|---|
| 0 | Non-protected |
| 1 | Protected against water drops |
| 2 | Protected against water drops when enclosure tilted up to 15°. |
| 3 | Protected against spraying water. Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects. |
| 4 | Protected against splashing water. Water splashed against the disclosure from any direction shall have no harmful effects |
| 5 | Protected against water jets |
| 6 | Protected against powerful water jets |
| 7 | Protected against the effects of temporary immersion in water. Intrusion of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water for 30 min. in 1 m depth. |

*) These protection classes define only protection against water!

### Chemical Resistance

The Resistance relates to the Housing of the IP67 modules and the used metal parts. In the table below you will find some typical resistance.

| Character | Resistance |
|---|---|
| Steam | at temperatures >100°C: not resistant |
| Sodium base liquor (ph-Value > 12) | at room temperature: resistant<br>> 40°C: not resistant |
| Acetic acid | not resistant |
| Argon (technical clean) | resistant |

### Key

- resistant: Lifetime several months
- non inherently resistant: Lifetime several weeks
- not resistant: Lifetime several hours resp. early decomposition

## 7.2 Accessories

### Mounting

| Ordering information | Description | Link |
|---|---|---|
| ZS5300-0011 | Mounting rail | Website |

### Cables

A complete overview of pre-assembled cables for fieldbus components can be found here.

| Ordering information | Description | Link |
|---|---|---|
| ZK1090-3xxx-xxxx | EtherCAT cable M8, green | Website |
| ZK1093-3xxx-xxxx | EtherCAT cable M8, yellow | Website |
| ZK1090-6xxx-xxxx | EtherCAT cable M12, green | Website |
| ZK2000-2xxx-xxxx | Sensor cable M8, 3-pin | Website |
| ZK2000-6xxx-xxxx | Sensor cable M12, 4-pin | Website |
| ZK2000-7xxx-0xxx | Sensor cable M12, 4-pin + shield | Website |
| ZK2020-3xxx-xxxx | Power cable M8, 4-pin | Website |
| ZK203x-xxxx-xxxx | Power cable 7/8 ", 5-pin | Website |

### Labeling material, protective caps

| Ordering information | Description |
|---|---|
| ZS5000-0010 | Protective cap for M8 sockets, IP67 (50 pieces) |
| ZS5000-0020 | Protective cap for M12 sockets, IP67 (50 pcs.) |
| ZS5100-0000 | Inscription labels, unprinted, 4 strips of 10 |
| ZS5000-xxxx | Printed inscription labels on enquiry |

### Tools

| Ordering information | Description |
|---|---|
| ZB8801-0000 | Torque wrench for plugs, 0.4…1.0 Nm |
| ZB8801-0001 | Torque cable key for M8 / wrench size 9 for ZB8801-0000 |
| ZB8801-0002 | Torque cable key for M12 / wrench size 13 for ZB8801-0000 |
| ZB8801-0003 | Torque cable key for M12 field assembly / wrench size 18 for ZB8801-0000 |

**Further accessories**

Further accessories can be found in the price list for fieldbus components from Beckhoff and online at https://www.beckhoff.com.

# 7.3 Version identification of EtherCAT devices

## 7.3.1 General notes on marking

### Designation

A Beckhoff EtherCAT device has a 14-digit designation, made up of

- family key
- type
- version
- revision

| Example | Family | Type | Version | Revision |
|---|---|---|---|---|
| EL3314-0000-0016 | EL terminal (12 mm, non-pluggable connection level) | 3314 (4-channel thermocouple terminal) | 0000 (basic type) | 0016 |
| ES3602-0010-0017 | ES terminal (12 mm, pluggable connection level) | 3602 (2-channel voltage measurement) | 0010 (high-precision version) | 0017 |
| CU2008-0000-0000 | CU device | 2008 (8-port fast ethernet switch) | 0000 (basic type) | 0000 |

### Notes

- The elements mentioned above result in the **technical designation**. EL3314-0000-0016 is used in the example below.
- EL3314-0000 is the order identifier, in the case of “-0000” usually abbreviated to EL3314. “-0016” is the EtherCAT revision.
- The **order identifier** is made up of
  - family key (EL, EP, CU, ES, KL, CX, etc.)
  - type (3314)
  - version (-0000)
- The **revision** -0016 shows the technical progress, such as the extension of features with regard to the EtherCAT communication, and is managed by Beckhoff.
  In principle, a device with a higher revision can replace a device with a lower revision, unless specified otherwise, e.g. in the documentation.
  Associated and synonymous with each revision there is usually a description (ESI, EtherCAT Slave Information) in the form of an XML file, which is available for download from the Beckhoff web site.
  From 2014/01 the revision is shown on the outside of the IP20 terminals, see Fig. *“EL5021 EL terminal, standard IP20 IO device with batch number and revision ID (since 2014/01)”*.
- The type, version and revision are read as decimal numbers, even if they are technically saved in hexadecimal.

## 7.3.2 Version identification of EP/EPI/EPP/ER/ERI boxes

The serial number/ data code for Beckhoff IO devices is usually the 8-digit number printed on the device or on a sticker. The serial number indicates the configuration in delivery state and therefore refers to a whole production batch, without distinguishing the individual modules of a batch.

| Structure of the serial number: **KK YY FF HH** | Example with serial number 12 06 3A 02: |
|---|---|
| KK - week of production (CW, calendar week) | 12 - production week 12 |
| YY - year of production | 06 - production year 2006 |
| FF - firmware version | 3A - firmware version 3A |
| HH - hardware version | 02 - hardware version 02 |

Exceptions can occur in the **IP67 area**, where the following syntax can be used (see respective device documentation):

Syntax: D ww yy x y z u

D - prefix designation
ww - calendar week
yy - year
x - firmware version of the bus PCB
y - hardware version of the bus PCB
z - firmware version of the I/O PCB
u - hardware version of the I/O PCB

Example: D.22081501 calendar week 22 of the year 2008 firmware version of bus PCB: 1 hardware version of bus PCB: 5 firmware version of I/O PCB: 0 (no firmware necessary for this PCB) hardware version of I/O PCB: 1

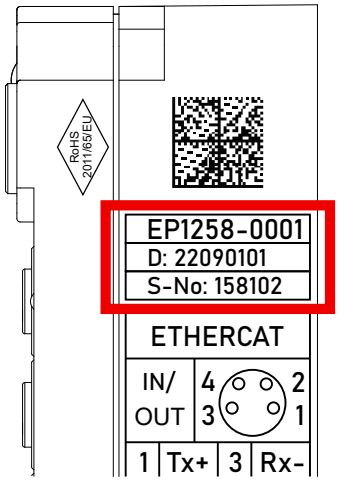



Fig. 74: EP1258-00001 IP67 EtherCAT Box with batch number/DateCode 22090101 and unique serial number 158102

### 7.3.3 Beckhoff Identification Code (BIC)

The Beckhoff Identification Code (BIC) is increasingly being applied to Beckhoff products to uniquely identify the product. The BIC is represented as a Data Matrix Code (DMC, code scheme ECC200), the content is based on the ANSI standard MH10.8.2-2016.

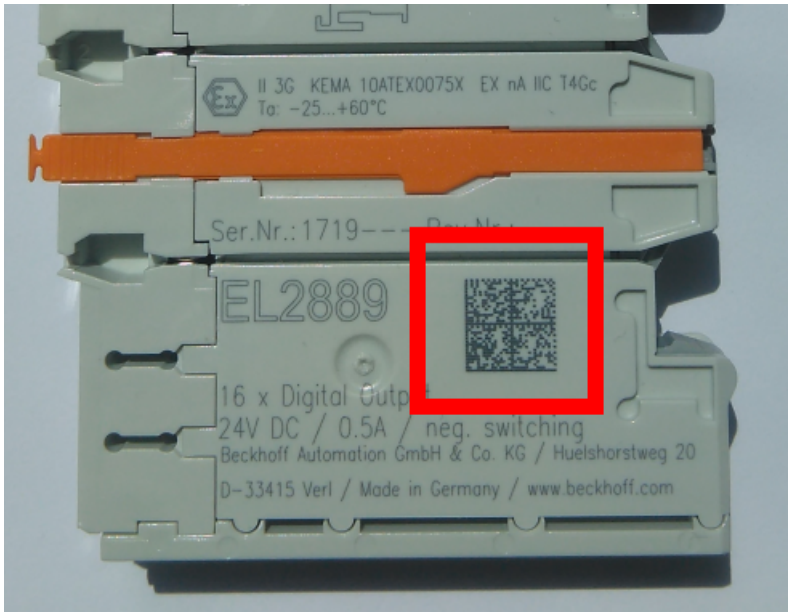



Fig. 75: BIC as data matrix code (DMC, code scheme ECC200)

The BIC will be introduced step by step across all product groups.

Depending on the product, it can be found in the following places:

- on the packaging unit
- directly on the product (if space suffices)
- on the packaging unit and the product

The BIC is machine-readable and contains information that can also be used by the customer for handling and product management.

Each piece of information can be uniquely identified using the so-called data identifier (ANSI MH10.8.2-2016). The data identifier is followed by a character string. Both together have a maximum length according to the table below. If the information is shorter, spaces are added to it.

Following information is possible, positions 1 to 4 are always present, the other according to need of production:

| Position | Type of information | Explanation | Data identifier | Number of digits incl. data identifier | Example |
|---|---|---|---|---|---|
| 1 | Beckhoff order number | **Beckhoff order number** | 1P | 8 | 1P072222 |
| 2 | Beckhoff Traceability Number (BTN) | **Unique serial number, see note below** | SBTN | 12 | SBTNk4p562d7 |
| 3 | Article description | **Beckhoff article description, e.g. EL1008** | 1K | 32 | 1KEL1809 |
| 4 | Quantity | **Quantity in packaging unit, e.g. 1, 10, etc.** | Q | 6 | Q1 |
| 5 | Batch number | Optional: Year and week of production | 2P | 14 | 2P401503180016 |
| 6 | ID/serial number | Optional: Present-day serial number system, e.g. with safety products | 51S | 12 | 51S678294 |
| 7 | Variant number | Optional: Product variant number on the basis of standard products | 30P | 32 | 30PF971, 2*K183 |
| ... | | | | | |

Further types of information and data identifiers are used by Beckhoff and serve internal processes.

### Structure of the BIC

Example of composite information from positions 1 to 4 and with the above given example value on position 6. The data identifiers are highlighted in bold font:

**1P**072222**S**BTNk4p562d7**1K**EL1809 **Q**1 **51S**678294

Accordingly as DMC:

Fig. 76: Example DMC **1P**072222**S**BTNk4p562d7**1K**EL1809 **Q**1 **51S**678294

### BTN

An important component of the BIC is the Beckhoff Traceability Number (BTN, position 2). The BTN is a unique serial number consisting of eight characters that will replace all other serial number systems at Beckhoff in the long term (e.g. batch designations on IO components, previous serial number range for safety products, etc.). The BTN will also be introduced step by step, so it may happen that the BTN is not yet coded in the BIC.

**NOTE**

This information has been carefully prepared. However, the procedure described is constantly being further developed. We reserve the right to revise and change procedures and documentation at any time and without prior notice. No claims for changes can be made from the information, illustrations and descriptions in this information.

## 7.3.4 Electronic access to the BIC (eBIC)

### Electronic BIC (eBIC)

The Beckhoff Identification Code (BIC) is applied to the outside of Beckhoff products in a visible place. If possible, it should also be electronically readable.

Decisive for the electronic readout is the interface via which the product can be electronically addressed.

### K-bus devices (IP20, IP67)

Currently, no electronic storage and readout is planned for these devices.

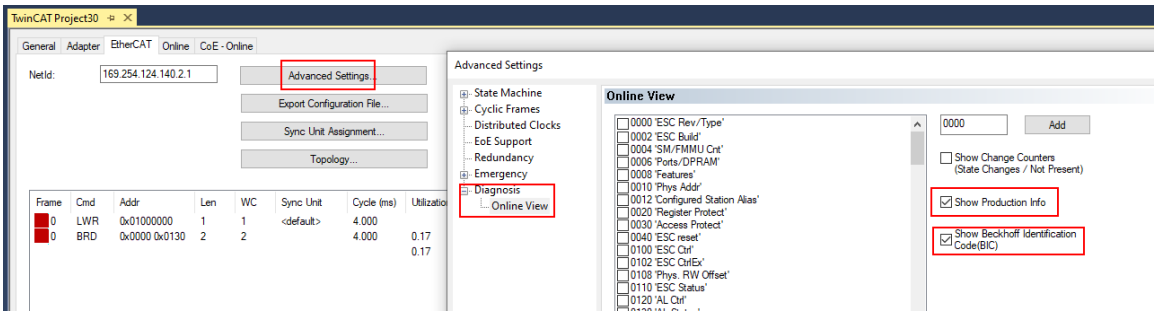
### EtherCAT devices (IP20, IP67)

All Beckhoff EtherCAT devices have a so-called ESI-EEPROM, which contains the EtherCAT identity with the revision number. Stored in it is the EtherCAT slave information, also colloquially known as ESI/XML configuration file for the EtherCAT master. See the corresponding chapter in the EtherCAT system manual (Link) for the relationships.

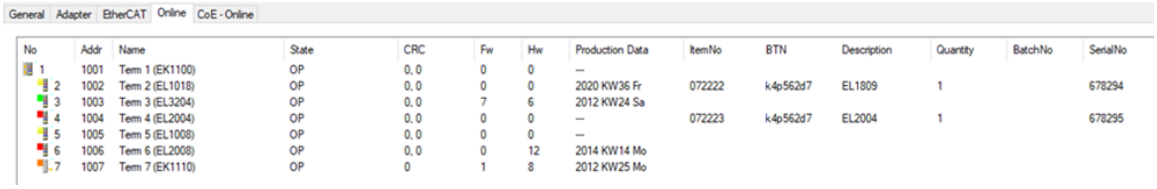
The eBIC is also stored in the ESI-EEPROM. The eBIC was introduced into the Beckhoff I/O production (terminals, boxes) from 2020; widespread implementation is expected in 2021.

The user can electronically access the eBIC (if existent) as follows:

- With all EtherCAT devices, the EtherCAT master (TwinCAT) can read the eBIC from the ESI-EEPROM
  - From TwinCAT 4024.11, the eBIC can be displayed in the online view.
  - To do this,
    check the checkbox "Show Beckhoff Identification Code (BIC)" under
    EtherCAT → Advanced Settings → Diagnostics:




  - The BTN and its contents are then displayed:




  - Note: as can be seen in the illustration, the production data HW version, FW version and production date, which have been programmed since 2012, can also be displayed with "Show Production Info".
- In the case of EtherCAT devices with CoE directory, the object 0x10E2:01 can additionally by used to display the device's own eBIC; the PLC can also simply access the information here:

- The device must be in SAFEOP/OP for access:

| Index | Name | Flags | Value | | |
|---|---|---|---|---|---|
| 1000 | Device type | RO | 0x015E1389 (22942601) | | |
| 1008 | Device name | RO | ELM3704-0000 | | |
| 1009 | Hardware version | RO | 00 | | |
| 100A | Software version | RO | 01 | | |
| 100B | Bootloader version | RO | J0.1.27.0 | | |
| 1011:0 | Restore default parameters | RO | > 1 < | | |
| 1018:0 | Identity | RO | > 4 < | | |
| 10E2:0 | Manufacturer-specific Identification C... | RO | > 1 < | | |
| 10E2:01 | SubIndex 001 | RO | 1P158442SBTN0008jekp1KELM3704 | Q1 | 2P482001000016 |
| 10F0:0 | Backup parameter handling | RO | > 1 < | | |
| 10F3:0 | Diagnosis History | RO | > 21 < | | |
| 10F8 | Actual Time Stamp | RO | 0x170bfb277e | | |

- the object 0x10E2 will be introduced into stock products in the course of a necessary firmware revision.

- Note: in the case of electronic further processing, the BTN is to be handled as a string(8); the identifier "SBTN" is not part of the BTN.
- Technical background
  The new BIC information is additionally written as a category in the ESI-EEPROM during the device production. The structure of the ESI content is largely dictated by the ETG specifications, therefore the additional vendor-specific content is stored with the help of a category according to ETG.2010. ID 03 indicates to all EtherCAT masters that they must not overwrite these data in case of an update or restore the data after an ESI update.
  The structure follows the content of the BIC, see there. This results in a memory requirement of approx. 50..200 bytes in the EEPROM.
- Special cases
  - If multiple, hierarchically arranged ESCs are installed in a device, only the top-level ESC carries the eBIC Information.
  - If multiple, non-hierarchically arranged ESCs are installed in a device, all ESCs carry the eBIC Information.
  - If the device consists of several sub-devices with their own identity, but only the top-level device is accessible via EtherCAT, the eBIC of the top-level device is located in the CoE object directory 0x10E2:01 and the eBICs of the sub-devices follow in 0x10E2:nn.

### Profibus/Profinet/DeviceNet... Devices

Currently, no electronic storage and readout is planned for these devices.

## 7.4 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

### Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on her internet pages: https://www.beckhoff.com

You will also find further documentation for Beckhoff components there.

### Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- support
- design, programming and commissioning of complex automation systems
- and extensive training program for Beckhoff system components

| | |
|---|---|
| Hotline: | +49 5246 963 157 |
| Fax: | +49 5246 963 9157 |
| e-mail: | support@beckhoff.com |

### Beckhoff Service

The Beckhoff Service Center supports you in all matters of after-sales service:

- on-site service
- repair service
- spare parts service
- hotline service

| | |
|---|---|
| Hotline: | +49 5246 963 460 |
| Fax: | +49 5246 963 479 |
| e-mail: | service@beckhoff.com |

### Beckhoff Headquarters

Beckhoff Automation GmbH & Co. KG

Huelshorstweg 20
33415 Verl
Germany

| | |
|---|---|
| Phone: | +49 5246 963 0 |
| Fax: | +49 5246 963 198 |
| e-mail: | info@beckhoff.com |
| web: | https://www.beckhoff.com |

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
Germany
Phone: +49 5246 9630
info@beckhoff.com
www.beckhoff.com